# ENVIRONMENTAL ASSESSMENT

for the

# EAST FORK ILLINOIS LANDSCAPE MANAGEMENT PROJECT

(EA# OR117-06-04)

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT
GRANTS PASS RESOURCE AREA

July 2006

Dear Reader:

We appreciate your interest in the BLM's public land management activities. Public involvement for the East Fork Illinois Landscape Management Project began in 1999 with a planned Forest Service / BLM joint EIS as the Upper Illinois Landscape Management Project. In 2001, a letter was sent to the public to provide an update on the progress of the EIS and to announce that because the responses were primarily related to the East Fork Illinois portion of the project area, the EIS would focus on the analysis of that area while the analysis of the BLM lands in the West Fork Illinois watershed would proceed separately as an Environmental Assessment (EA).

Following the Biscuit Fire in 2002, the Forest Service directed their planning efforts to the burn area and away from the East Fork Illinois watershed. Subsequently in 2005, the BLM decided to proceed with its own planning for the East Fork Illinois Landscape Management Project on BLM administered lands. A letter was sent to the public in September 2005 updating neighbors and interested citizens on the status of the project, announcing the decision to analyze the project on BLM land through preparing an EA, and inviting them to contact the BLM with information, comments and concerns. The scoping letter was sent to residents and landowners near or adjacent to BLM parcels within the planning area, to federal, state, and county agencies, and to private organizations and individuals that requested information concerning projects of this type. Personal discussions and comment letters provided public input to BLM for consideration in the EA. All public input was considered by the planning and interdisciplinary teams in developing the proposals and in preparation of this EA.

We appreciate your taking the time to review this environmental assessment (EA). If you would like to provide us with written comments regarding this project or EA, please send them to me at 2164 NE Spalding Avenue, Grants Pass, OR 97526.

If confidentiality is of concern to you, please be aware that comments, including names and addresses of respondents, will be available for public review or may be held in a file available for public inspection and review. Individual respondents may request confidentiality. If you wish to withhold your name and address from public review or from disclosure under the Freedom of Information Act, you must state this clearly at the beginning of your written comment. Such requests would be honored to the extent allowed by law. All submissions from organizations or officials of organizations or businesses will be made available for public inspection in their entirety.

I look forward to your continued interest in the management of our public lands.

Abbie Jossie
Field Manager
Grants Pass Resource Area

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT

EA COVER SHEET

RESOURCE AREA: *Grants Pass Resource Area* EA # OR-117-06-04

ACTION/TITLE: *East Fork Illinois Landscape Management Project*

LOCATION: T40S, R8W, Sections 15, 23, 24, 26, 27, 28, 33, 34, 35
T41S, R8W, Sections 3, 10

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# 1.0 Purpose of and Need for Action

## 1.1 Introduction and Plan Conformance

The overarching purpose of the proposed action is to implement the Medford District Resource Management Plan. The proposed action is designed to meet a variety of resource, social and economic needs of the East Fork Illinois landscape including:

- Management of the watershed in a manner that would provide for and promote a wide variety of non-commodity outputs and conditions including wildlife habitats, sustainable forest conditions, fuel hazard reduction, recreation opportunities, maintenance or improvement of water quality, and fisheries.
- Contribution to the Medford District's timber harvest / forest products commitment on matrix lands, thus helping meet the demand for wood products locally, regionally and nationally.

The purpose of this environmental assessment (EA) is to evaluate a range of alternatives, assess regulatory compliance and efficacy in meeting project area needs, and to determine if preparation of an EIS is required. The EA would assist in the decision making process by assessing the environmental and human effects resulting from implementing the alternatives.

This EA complies with the following decisions and plans:

(1) *Final EIS and ROD for the Medford District Resource Management Plan* (RMP) (1995).
(2) *Final Supplemental EIS on Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl* (1994).
(3) *ROD for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl and its attachment A entitled the Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* (NWFP)(1994).
(4) *Final SEIS for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (2000), and the *ROD and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (2001)
(5) *ROD Amending Resource Management Plans for Seven Bureau of Land Management Districts and Land and Resource Management Plans for Nineteen National Forests Within the Range of the Northern Spotted Owl,* and its *Final SEIS for the Clarification of Language in the 1994 ROD for the Northwest Forest Plan* amending wording about the Aquatic Conservation Strategy (2004).
(6) *Medford District Noxious Weed Environmental Assessment* (1998).
(7) *ROD, Management of Port-Orford Cedar in Southwest Oregon* (2004)

In addition to the documents cited above, project planning drew from information and recommendations from the following:

(1) *East Fork Illinois River Watershed Analysis* (2000)
(2) *Rogue River/South Coast FY04-08 Timber Sale Projects Biological Assessment* (2003) and *USFWS Biological Opinion* (#1-15-03-F-511, 2003).

(3) *2003 Survey and Manage Annual Species Review* (Forest Service Memorandum, November 20, 2001, file code 1900/2620; and BLM Information Bulletin No. OR-2002-033).
(4) *Visual Resource Contrast Rating BLM Manual Handbook 8431-1*
(5) BLM Manual 6840 – Special Status Species Management (2001)
(6) National Fire Plan (NFP) (2000)
(7) National Fire Plan 10-year Comprehensive Strategy and Implementation Plan (2002)
(8) Josephine County Integrated Fire Plan (November 2004)
(9) Illinois Valley Fire Plan (2005)
(10) Evaluation of the Waldo-Takilma ACEC Nomination (Medford District BLM, Grants Pass Resource Area, 2004)
(11) Healthy Forest Restoration Act (2003)
(12) Healthy Forest Initiative (2003)

## 1.2 Purpose of and Need for Action

The East Fork Illinois River Landscape Management Project is designed to meet a variety of resource and human (social/economic) needs and objectives outlined in the RMP and the Northwest Forest Plan. These include the following:

**Fuel Hazard Reduction:** The entire East Fork Illinois project area lies in National Fire Plan (NFP) designated Wildland Urban Interface while 71% is within the designated Community at Risk boundary. Eighty-five percent of the project area is in fire regime condition class (FRCC) 3. FRCC 3 results from departure from reference condition vegetation, fuels and disturbance regimes. As a result, vegetation attributes, fuel loading, and fire behavior have been significantly altered. FRCC 3 represents a greater risk than the reference condition for increased fire size, intensity, and severity.

The purpose of the project is to proactively treat the activity fuels to reduce the time of elevated hazard and to reduce the potential for high intensity ground fire in the event of a wildfire. Treatments are designed to reduce canopy bulk density and surface fuels and increase canopy base height by reducing stand density.

**Health and Structural Diversity of Upland and Riparian Forest Stands:** Tree densities are high with most forests at or near full site occupancy (85 to 100%). Overcrowding is causing density dependent mortality, crown recession, reduced tree vigor, shading of large hardwoods, and exclusion of new regeneration. In mature forests many of the overstory trees and large hardwoods are dead, dying or declining in health. In young and mid-seral forests, resource competition has increased time to development of late-successional forest structure. Douglas-firs are encroaching on pine and oak sites resulting in competition induced mortality to all species.

The purpose of the project is to reduce densities in high density stands, reduce mortality and increase individual tree vigor and stand resiliency to insects and disease. In pine and oak sites, the purpose is to reduce encroachment, create a more open stand structure to perpetuate or establish pines and oaks into the future stand, and maintain conditions more conducive to long term sustainability. In riparian areas, objectives include enhancing connectivity and accelerating the rate of development of late-successional habitat conditions.

**Commodity Production:** As stated in the RMP, an objective of matrix land is to produce a sustainable supply of timber and other forest commodities to provide jobs and contribute to community stability.

The requirement to produce forest commodities was further emphasized in the settlement agreement between the forest industry and federal land management agencies (Douglas Timber Operators, et al. v. Secretary of Agriculture, et al., Civil No. 01-6378-AA (D. Oregon)) which identified matrix and O&C land as the primary land allocations for forest product production. The O&C Act requires the BLM to manage O&C lands for permanent forest production on a sustained yield basis while protecting watersheds, and manage in accordance with other environmental laws (RMP p. 17).

Public involvement throughout the Illinois Valley identified an increasing desire to improve local economies through stewardship contracting, biomass utilization, and special forest products. Currently, there are few opportunities in the Illinois Valley offering stewardship contracting and biomass utilization.

Closely tied to improving health and structural diversity of upland and riparian forest stands is commodity production. The purpose of commodity production is to help meet the demand for wood products and contribute to the Medford District's commitment on matrix lands to produce a sustainable supply of forest products.

**Road Maintenance:** Some roads in the project area are routing water and sediment into the channel network, reducing road safety and increasing sedimentation. Lack of road system maintenance may hinder fire suppression / public access.

The purpose of road maintenance is to address erosion problems, increase road safety and improve access for fire suppression and the public.

**Wildlife Habitat Restoration:** Jeffrey pine and shrub dominated serpentine soils are experiencing shrub encroachment above levels that would be maintained under a more regular disturbance regime (i.e., periodic fire). Brush fields are becoming senescent and in some areas, impede movement of large mammals. Travel corridors have become impeded and senescent brush provides poor browse for deer, rabbits and other herbivores.

The purpose of wildlife habitat restoration is to reduce encroachment and rejuvenate senescent brush fields, improving browse and access for a variety of animals.

### 1.3 Project Location and Land Use Allocations

The project area is located in the East Fork Illinois River 5$^{th}$ field watershed. Project area maps are in Appendix A (Maps 1 and 2). The project area is in matrix (Southern General Forest Management Area) and riparian reserve land allocations. Management objectives for the different land use allocations (LUA) are set forth in the Northwest Forest Plan (NWFP) and the Medford District's Resource Management Plan (RMP). Refer to these documents for a discussion of relevant objectives.

Matrix land allocation comprises approximately 8% of the Grants Pass Resource Area. The East Fork Illinois (EFI) Project area includes 1,909 acres of BLM managed lands of which 1,600 acres were designated matrix. As stated in the Northwest Forest Plan and the Medford Resource Management Plan (RMP pp. 38-39) objectives for matrix land are to:

- Produce a sustainable supply of timber and other forest commodities to provide jobs and contribute to community stability.

- Provide connectivity (along with other allocations such as riparian reserves) between late-successional reserves.
- Provide habitat for a variety of organisms associated with both late-successional and younger forests.
- Provide for important ecological functions such as dispersal of organisms, carryover of some species from one stand to the next, and maintenance of ecologically valuable structural components such as down logs, snags, and large trees.
- Provide early-successional habitat.

### 1.4 Issues and Concerns

A variety of issues and concerns were raised during project scoping by interested individuals or groups outside the BLM and by BLM's interdisciplinary team. In this EA an issue is something unique to the project area that may need particular consideration and which may contribute to defining a particular action alternative.

Pertinent issues are listed below. Many of these issues were identified through the public scoping process and in the East Fork Illinois River Watershed Analysis and were used in the design of the proposed project and alternatives. In some cases, an issue was initially considered by the planning team and then eliminated from further analysis because it was not within the scope of the project or did not meet the purpose and need. These are summarized in Appendix E.

1. The entire project area is designated Wildland Urban Interface (WUI) and 71% is within the designated Community At Risk (CAR).

2. High stand densities throughout the project area are resulting in declining vigor of conifers and shade intolerant species (i.e., ponderosa pine, sugar pine, black oak, Pacific madrone).

3. Rural Interface Area Management/Social Issues/Quality of Life- Concerns are related to domestic and municipal water, visual quality, recreation, and local economy.

4. The watershed contains streams listed on the state DEQ 2002 303(d) list as water quality limited for high summer water temperatures.

5. Cultural Resources- The project area contains numerous historical/archeological sites. They include the earliest evidence of placer mining in Josephine County and southwest Oregon. Some sites are listed on the National Register of Historic Places under the multiple property submission known as the "Mining Resources of the Upper Illinois Valley, Oregon."

6. An Area of Critical Environmental Concern (ACEC) has been proposed by the local community and has been nominated by the BLM as an ACEC under the Western Oregon Plan Revision. Final determination and designation is thus outside the scope of East Fork project decision. Until an RMP process review occurs, special management attention will ensure that nominated ACEC values are protected.

   In an ACEC nomination, the identification of resource values that meet "relevance and importance criteria" and the determination that there is a nominated ACEC for consideration in the RMP process do not preclude active resource management activities in the interim. "Temporary management includes those reasonable measures necessary to

protect significant resource values from degradation until the area is fully evaluated through the resource management planning process" (BLM Manual 1613.21(E)). Resource management activities appropriate to the underlying land allocation and RMP management direction are permissible as long as the nominated ACEC values are not degraded.

# 2.0 Proposed Action for each Alternative

## 2.1 Alternative 1: The No Action Alternative

The "no-action" alternative is defined as not implementing any aspect of the action alternatives. Defined this way, the no action alternative also serves as a baseline or reference point for evaluating the environmental effects of the action alternatives. Inclusion of this alternative is done without regard to the decision made in the Medford District RMP and without regard to meeting the purpose and need for the project.

It should be pointed out that the no action alternative is not a "static" alternative. It is implied that the present environmental conditions and trends will continue. This would include trends such as vegetation succession and consequent terrestrial and aquatic habitat changes, increases in fire hazard, continued road condition or deterioration, and continued or increasing rates of erosion, as well as current road densities and various unregulated uses (i.e. OHV use, equestrian use, wood theft, illegal dumping) etc.

## 2.2 Alternatives 2, 3 and 4: Action Alternatives

In designing the three action alternatives, other options or alternatives were considered during the planning phase of this project. Alternatives considered but not analyzed in detail are summarized in Appendix E. Those carried forward in the three action alternatives are described in this section. Tables 1 and 2 display the actions and acres of vegetation treatment for each alternative. The project design features described in Chapter 2 are also an integral part of all of the action alternatives and are designed to minimize the environmental impacts of the project.

**Table 1. Comparison of the Action Alternatives**

| Activity/Program | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|
| Commercial treatments on matrix lands | Commercial Harvest; PCT, SFP, Matrix CC=40% | PCT, SFP, Selective harvest; no CC reduction | Commercial Harvest; PCT, SFP Matrix CC=60% |
| Non-commercial treatments on matrix lands | Treat all activity fuels. Treat natural (existing) fuels throughout project area | Treat all activity fuels. Natural fuels treatment focus is on CAR and strategic areas (roadsides, ridges etc.) | Same as Alt. 3 |
| Riparian Reserves | Riparian thinning to 50-60% CC. Fuel reduction | Fuel reduction only | Riparian treatments in structurally un-developed stands to 50-60% CC. Fuel reduction |
| Roads | Common to all Alternatives (see Appendix C) | Road maintenance same as Alt. 2 but no new construction | Same as Alt. 2 |
| Wildlife Restoration | Natural fuels reduction throughout project area | Natural fuels reduction in WUI, CAR and strategic areas | Same as Alt. 3 |
| Young Stand Management | PCT and brushing | | |

| | |
|---|---|
| Recreation and Cultural Development /Enhancement/ Protection of Integrated Resources | Ditch/trail development, interpretive opportunities |

PCT = Pre-commercial thinning; SFP = Special Forest Products; CC = Canopy Closure

**Table 2. Vegetation Treatment Summary by Alternative**

| Proposed Action | Alternative 2 (% of 6th field watershed) | Alternative 3 | Alternative 4 |
|---|---|---|---|
| **Commercial Harvest and Activity Fuel Treatment in Older Seral Stands** | | | |
| Restoration Thinning (includes riparian except alt 3) | 171 (0.5) | 83 | 171 |
| Selective Cut (no Riparian) | 0 | 200 | 0 |
| Commercial Thinning/Density Management/Modified Group Selection | 592 (1.9) | 0 | 530 |
| Density Management (riparian) | 175 (0.5) | 0 | 123 |
| **Total Harvest Acres (estimated volume removed)** | **938 (5.62 mmbf)** | **283 (0.12 mmbf)** | **824 (2.78 mmbf)** |
| Activity Fuels Treated (includes riparian) | 938 | 283 | 824 |
| **Non-commercial activities on matrix and riparian (except special forest products and biomass utilization)** | | | |
| Fuel Hazard Reduction | 351 (1.0) | 488 | 275 |
| Wildlife Restoration | 472 (1.5) | 188 | 188 |
| Young Stand Treatments | 46 (0.1) | 46 | 46 |
| **Total Non-Commercial Treatment Acres** | **869** | **722** | **509** |
| No Treatment (acres) | 102 | 653 | 576 |

mmbf = million board feet; mbf = thousand board feet

### 2.2.1 Fuel Hazard Reduction — Alternatives 2 and 3

### Objectives

The entire project area is in the National Fire Plan (NFP) designated wildland urban interface (WUI). Approximately 71% of the project area is designated as a community at risk (CAR). The NFP and its *10-Year Comprehensive Strategy and Implementation Plan*, the *Josephine County Integrated Fire Plan* (JCIFP) and the *Illinois Valley Fire Plan* emphasize reducing wildfire severity in these areas. The NFP also directs fuel hazard reduction in these areas to decrease the risk to residences, businesses and resources should a wildfire occur. Fuel hazard reduction includes activity generated fuels and natural (existing) fuels.

Activity fuels are surface fuels that have been created as a result of stand treatments (precommercial thinning, brushing, and older seral stage stand treatments) described in the vegetation treatment section. These activity generated surface fuels increase fuel hazard until they are treated. As the Sierra Nevada Ecosystem Project Report (1996) points out (p.4):

> Timber harvest, through its effects on forest structure, local microclimate, and fuel accumulation, has increased fire severity more than any recent human activity. If not accompanied by adequate reduction of fuels, logging (including salvage of dead and dying trees) increases fire hazard by increasing surface dead fuels and changing the local microclimate. Fire intensity and expected fire spread rates thus increase locally and in areas adjacent to harvest. **However, logging can serve as a tool to help reduce fire hazard when slash is adequately treated and treatments are maintained** [emphasis added].

Natural fuels are those that exist as a part of the current stand / vegetation type and configuration. Fire exclusion, and vegetation growth and succession in the absence of frequent, low to moderate severity wildfire events has resulted in conditions of high fuel hazard in the project area. Surface fuel loads are high, ladder fuels are extensive, and lower, middle and upper canopies are dense. Consequently, there is a very high potential for high intensity and high severity wildfire.

The objective of proposed fuel hazard reduction is to alter fuel loadings and configuration to reduce the potential for high severity fire, reduce the time of elevated hazard, and make suppression efforts safer and more effective in the event of a wildfire, thereby protecting resource values and adjacent private property.

**Proposed Actions**

Three proactive fuel hazard reduction alternatives are proposed which focus on reducing standing live fuels by removing small trees and flammable brush ≤8" dbh and reducing surface fuels. The alternatives differ in the extent (acreage) and distribution of proposed units (Appendix A, Maps 3, 4 and 5). In all instances where the "home ignition zone" of a residence or structure on private land extends onto BLM, consultation with the land owner would identify any special fuel treatment work necessary to reduce the wildland fire threat to the structure / residence.

Fuel treatments proposed in alternatives 2, 3 and 4 (Appendix B, Unit Treatments) reflect the current best judgment regarding fuel hazard reduction. Proposed treatments may be adjusted based on interdisciplinary team post-harvest review of conditions and on considerations of site specific physical, biological, and social features at the time of review. Treatment adjustments would still fall within the range of treatments analyzed and proposed in this EA.

Fuel Hazard Reduction Methods

Activity fuels would be treated in all units proposed for harvest in mid and older seral stage stands and in some young stands (generally within the CAR boundary). Activity and natural fuel treatments would be similar. The method of treatment is as follows:

*Initial fuel reduction:* Understory vegetation would be thinned using manual and mechanical techniques (slashing, pruning) to the desired tree densities and stocking levels. The slash created from the selective slashing treatment, including harvest activity slash would then be handpiled and burned (HP/B). It can be expected that ≤10% of each individual pile would not be consumed leaving pile "rings" and that ≤5% of the piles on the site would not burn resulting in scattered pockets of surface fuels remaining on site. In areas where biomass utilization has been identified as a potential treatment option (Map 6), efforts will be made to identify and develop

economically and ecologically viable alternatives for biomass removal. The remaining fuels not removed as biomass would be handpiled and burned or underburned.

*Maintenance Underburning:* Periodic, low intensity underburns following initial fuel reduction would maintain desired fuel conditions. It is estimated that maintenance burning throughout the project area would be on a 7-15 year rotation in areas classified as fire regime 1 and on a 10-30 year rotation for areas in fire regime 3. Maintenance burning that would occur more than five years following the issuance of a decision on this project would be assessed for adequacy of existing NEPA analysis at that time. Prior to maintenance underburning, approximately 90% of madrone (and some oak) resprouts (one to three stems on each plant would be retained) would be cut.

Treatment Descriptions

A variety of tools would be used to reduce fuel hazards and to achieve ecological goals for habitat enhancement.

*Slashing (SL)* Understory vegetation density would be reduced by cutting and spacing of conifers <8" dbh and hardwoods <12" dbh. Retained vegetation would be spaced 14-45' apart. Within this range, wider spacing would be used for larger leave trees or for species such as pine or oak which thrive in less dense conditions. Vegetation diversity would be obtained by maintaining species occurring at low frequencies in the stand (i.e. Pacific yew, pine, vine maple). Untreated vegetation groups ranging in size from 1/10 to two acres would be retained.

*Hand piling and burning (HP)* is typically used when underburning is not possible due to heavy fuel loads. Sticks 1-6" diameter and longer than two feet would be piled by hand. The piles would be covered with plastic to create a dry ignition point and would be burned in the fall or winter when the risk of fire spread (scorch or mortality) to nearby residual trees and shrubs is minimized. It is expected that hand piles would be burned in the first winter or early spring following the construction of the pile unless fuels have not cured or atmospheric conditions are not conducive for adequate smoke management.

*Understory Burning (underburning) (UB)* is used where the objective is to maintain ≥80% of the overstory. The objective is to reduce dead and down woody material, shrubs and small trees in the understory, and live and dead branches close to the ground. Underburning is conducted throughout the year when fuel and weather conditions permit. Typically, burning occurs between fall and spring. Summer or early fall burning is less common, but can be feasible to meet resource objectives and when risk of fire escape can be mitigated.

Underburning is conducted using hand ignition methods and drip torches as the primary ignition device. Desired fire intensity is site specific based on the desired site conditions, vegetation type and size and fuel loadings and would be controlled by number and spacing of burn strips. Most underburns require a control line around the burn area. Existing natural control lines such as major streams and rocky areas or man made barriers such as roads are used as much as possible to minimize soil disturbance. In the absence of existing control lines, hand lines would be constructed using chainsaws and hand tools. Hand lines consist of the removal of all fuels down to mineral soil for a width of 1-3 feet, depending on fuel loading. Water bars would be used on slopes exceeding 10%. Hand lines would rehabilitate naturally and would likely be used during maintenance underburn.

*Biomass removal:* Biomass is any dead or living vegetation in a fuels unit that is ≤8" in diameter

for conifers and ≤12" for hardwoods. For slopes <35%, mechanized low ground pressure machinery would cut, skid, haul or chip biomass. On slopes >35%, biomass would be cable yarded.

**Alternative 2**

Approximately 351 acres of natural fuels in the CAR and WUI would be treated. In addition, 938 acres of activity fuels would be treated (see Appendix B for specific unit treatments. See also Appendix A, Maps 3, 4 and 5). Treatments would include a mix of slashing, underburning and handpile burning, depending on site specific conditions.

Fuel hazard reduction would also occur in riparian areas, Jeffrey pine areas and shrublands (see riparian reserve and wildlife sections). Treatments are anticipated to take place over a 3 to 5 year period.

Biomass may be removed during initial fuel hazard reduction. Approximately 600 acres of ground based extraction and 100 acres of cable based extraction are proposed. It is anticipated that actual acres treated would be less due to economic, safety and access limitations. In riparian areas and the proposed ACEC, biomass removal would be limited to areas accessed by existing roads and skid trails (see PDFs). Prescribed treatments are intended to reduce hazardous fuels while utilizing the biomass to benefit the local economy. In areas where biomass extraction is not feasible, hand piling and burning would occur. Ground based methods would utilize existing skid trails whenever possible. Non-harvest units would require the designation of skids trails, spaced approximately 75' apart.

**Alternative 3**

Fuel hazard reduction would occur on approximately 488 acres of natural fuels, focusing on areas in the CAR, ridge tops and roadways that have strategic importance in wildfire suppression (Appendix B, Table B-2). In addition, 283 acres of activity fuels would be treated. Treatments would include a mix of slashing, underburning and handpile burning, depending on site specific conditions.

Alternative 3 fuel hazard reduction treatments would create a fuel break around communities for safer and more effective structure protection and provide wildland fire fighters anchor points for indirect fire fighting techniques. Fuel hazard reduction in riparian reserves will be discussed further in the riparian reserve sections. Treatments are anticipated to take place over a 3 to 5 year period.

Proposed biomass removal is identical to Alternative 2.

**Alternative 4**

Fuel hazard reduction work would be implemented on approximately 275 acres of natural fuels, focusing on areas in the CAR and along ridge tops that have strategic importance in wildfire suppression (Appendix B, Table B-2). Within these acres, fuels treatments and objectives are similar to those in Alternative 3. An additional 864 acres of activity fuels would be treated. Proposed biomass removal is identical to Alternative 2.

| Table 3. Fuel Treatment in the WUI and CAR | | | | |
|---|---|---|---|---|
| **Alternative** | **WUI** | **CAR** | **Acres** | **No-Treatment Acres** |
| 2 | 942 | 819 | 1,761 | 133 |
| 3 | 301 | 704 | 1,005 | 684 |
| 4 | 507 | 826 | 1,333 | 561 |
| These acres include activity fuels, natural fuels, wildlife habitat restoration, and young stands | | | | |

### 2.2.2 Older Seral Stage Stand Treatments

**Objectives**

Objectives are to reduce stand densities, increase diameter growth rates of remaining trees, perpetuate the historic mixture of tree species, promote multi-layered stand structure, reduce the risk of a stand replacing fire, and contribute to the BLM's commitment to provide forest products.

*1. Reduce stand densities*: Growth stagnation, resulting from abnormally high tree densities renders even the dominant trees highly susceptible to bark beetles, defoliating insects, dwarf mistletoe, and root diseases (Knutson et. al. 1986; Byler and Zimmer-Grove 1991; Cochran and Barrett 1995; Filip et al. 1999).

*2. Perpetuate the historic mixture of tree species*: Fire exclusion has created a shift from fire-tolerant (ponderosa pine and black oak) to less fire-tolerant species (Douglas-fir) (Atzet 1995). Pines and black oaks require openings and bare mineral soil for regeneration. Overstory trees are experiencing intense competition from abnormally high tree densities, resulting in reduced vigor and subsequent mortality.

*3. Promote / retain a multi-layered stand structure*: Manage for multi-layered stands by prescribing treatments that maintain existing desired structure or by prescribing silvicultural treatments that create conditions that are favorable for the initiation of desired species and stand conditions such as the creation / retention of snags, down wood, large vigorous hardwoods, and understory vegetation diversity (Tappeneir and McDonald 1979; Berg 1996; White 2001).

*4. Reduce the risk of a stand replacing fire*: Vegetation density and composition, surface fuels and fuel arrangement are factors which influence fire behavior that can be directly manipulated to reduce the risk of a stand replacing fire (Agee 1993; Graham et al. 1999).

*5. Contribute to the BLM's commitment to provide forest products*: Harvest would be balanced with other RMP objectives for resources such as soil, water, and habitats. In order to provide a sustainable supply of timber, some proposed actions focus on stand development.

**Prescription Descriptions**

C*ommercial thinning* (CT) is typically prescribed for even-aged stands with a single canopy layer. In these stands, growth rates are beginning to decline due to competition. Commercial entry would focus on retaining the most vigorous dominant and co-dominant overstory trees. Vigorous ponderosa and sugar pines would be preferred leave species to promote diversity and

contribute fire resiliency to stands. Retention levels will target a relative density of 35% with an approximate canopy closure of 40%.

*Density management* (DM) is typically prescribed for uneven-aged stands for the primary purpose of widening the spacing of residual trees in order to promote growth and structural development of the remaining stand. Many of these stands developed in conjunction with disturbance (fire, insects, harvest, etc.) and have several layers containing multiple species. Spacing of the residual trees would be based on the crown radius of the healthiest dominant and co-dominant trees to achieve an average relative density of 35%.

*Modified group selection* (Mod GS) is the removal of trees (usually Douglas-fir) that are competing with vigorous pines and non-tanoak hardwoods with a greater than 30% live crown ratio.

*Restoration thinning* (RT) is prescribed for mixed conifer/hardwood stands. Typically the oldest trees are oaks and pines with a younger cohort of low vigor Douglas-fir. On these drier sites, vigorous pines and oaks would be the preferred leave species. Tree spacing is greater for these areas in order to restore the site to an open pine/oak savannah condition to achieve an average relative density of 25%. Once restored, maintenance underburning would maintain desired site conditions.

*Selective Cut* retains current canopy closures by selectively removing the suppressed and intermediate trees to accomplish density management. Typically these are the smallest trees in the stand with low crown ratios. This treatment provides forest products while maintaining closed canopy forests.

**Proposed Actions**

Three alternatives for managing mid- and mature seral stage stands are presented. The proposed treatments described in this section apply to matrix lands and have been developed according to site conditions and the focus of each alternative. Riparian harvest treatments are described in detail in the riparian reserve section of this chapter. Specific treatments and units are shown in Appendix B. Following harvest, activity generated fuels would be slashed, handpiled and burned or underburned.

Alternative 2
Under this alternative, 46 acres would be commercially thinned. Density management/modified group selection is proposed on 546 acres in highly productive Douglas-fir/tanoak sites. The residual density would range between 25% on dry ridges and 45% on the lower, more mesic sites. Restoration thinning is proposed on 91 acres.

Alternative 3
This alternative was developed partially in response to public scoping comments. The primary objective of this alternative is to manage more for scenic and wildlife values, rather than providing timber products to the industrial forest sector. Selective cutting of suppressed and intermediates trees and restoration thinning would occur on approximately 200 and 83 acres, respectively. This removal would not reduce canopy cover and would target only the smallest least vigorous trees. This prescription would occur only on areas accessible to ground or cable systems.

Alternative 4

In this alternative, stand canopy closure would be at least 60% in mid and mature conifer stands. This alternative was designed to retain canopy cover for late-successional dependent species, while still providing for density and fuel hazard reduction. Tree removal would occur in the smallest diameter classes, removing trees from the suppressed and intermediate crown classes. Codominants and dominants would be removed only if 60% canopy closure could be maintained and if they had less than 30% vigorous live crown. Density management and restoration thinning would occur on 530 and 91 acres, respectively.

### 2.2.3 Young Stand/Forest Development — Alternatives 2, 3 and 4

**Objective**

Conifer plantations are experiencing intense competition from brush and hardwoods and need to be managed in order to reduce stand densities, promote species diversity, and maintain vigorous crowns. Surplus vegetation would be cut in order to accelerate growth, promote stand differentiation, and maintain the non-tanoak hardwood component for future stand diversity.

**Proposed Action**

*Precommercial Thinning (PCT)* – Surplus trees and brush would be cut or girdled. All tanoak <12" dbh and most brush would be cut. All sprouting hardwood stems not selected as leave trees and all surplus trees <8" dbh would be cut. Vigorous, well-formed conifer leave trees would be spaced 14-16' apart. Non-tanoak hardwood sprout clumps would be thinned to the single largest stem and spaced 25-40' apart in the matrix. All hardwoods in riparian reserves would be thinned to a single stem, spaced 25' apart. Retained stems in sprout clumps would be those with the largest diameter 2' above the ground, that are the straightest, have the best formed crowns, and have origins closest to the base of the stump.

*Brushing (BR)* - Brush, tanoak <12" dbh and excess non-tanoak hardwoods would be manually cut. Conifer leave trees <6" dbh would be spaced approximately 8' apart and non-tanoak hardwoods < 8" dbh would be spaced 25' apart.

Approximately 35 acres would be brushed and precommercially thinned (see Appendix B). Activity fuels would be treated for fuel hazard reduction based on hazard and resource values in and adjacent to the stand. All acres may not be treated for fuels. The most common slash treatment would be hand pile and burning (HP). Other treatments options include biomass utilization or removal of slash as poles or firewood.

### 2.2.4 Wildlife Habitat / Jeffrey Pine Restoration - Alternatives 2, 3 and 4

**Objective**

Jeffrey pine and shrub dominated serpentine sites are experiencing shrub encroachment above levels that would be maintained under a regular disturbance regime of periodic fire. The objective in these areas is to reintroduce fire, reduce brush encroachment to facilitate large mammal travel, restore the vigor of fire-adapted brush species, restore a variety of plant communities, and increase browse for large and small herbivores.

**Proposed Actions**

Fuel hazard reduction treatments (described above) would be used to restore Jeffrey Pine savannahs by reducing the encroachment of Douglas-fir, incense cedar, and shrubs such as ceanothus and manzanita. Decadent brush and small diameter conifers would be targeted for removal; all vigorous pine and large limbed, open grown Douglas-fir would be retained. Manual treatment with chain saws may be done prior to burning to reduce potential of escape and to reduce fire severity. Small temporary fire lines may be constructed on the edge of the savannahs.

Alternative 2 would treat 351 acres with a variety of fuel hazard reduction treatments (see section 2.2.1) throughout the watershed. Alternatives 3 and 4 would each treat 160 acres. Riparian areas would be included.

### 2.2.5 Riparian Reserves - Alternative 2, 3 and 4

**Objective**

High tree density in many riparian zones has reduced tree vigor and health. As a result, the time required for large tree development to function for wildlife connectivity and large wood recruitment has greatly increased. There is also a need to reduce fuel hazard. The objective of treating riparian zones would be to expedite large tree development for wildlife habitat and future instream large wood recruitment, improve wildlife habitat in oak savannah and pine stands, protect key resources from wildfire and reduce the risk of wildfire in riparian areas as well as the risk of wildfire spreading to adjacent areas and local communities.

**Proposed Action**

**Alternative 2**

Riparian reserve treatments would be based on local stand / vegetation conditions and would be designed to benefit aquatic systems and be consistent with ACS objectives. Riparian reserve widths and no treatment zones are displayed in Table 4. Unstable and potentially unstable areas (areas showing active movement and indications of past movement) are considered riparian reserves (NWFP, p. C-30, C-31). Treatments would not occur in the no-treatment zone adjacent to streams.

Vegetation treatments would include thinning, brushing, hand piling and burning, and underburning. There would be 97 acres of fuel hazard reduction, 255 acres of density management and restoration thinning, 121 acres of wildlife habitat restoration (burning), and 11 acres of young stand management. Ignition of underburning would occur outside the no treatment buffers but could burn into the no treatment zone.

In thinning units outside the no treatment buffer, leave trees would be the largest in the stand. All trees showing old-growth characteristics would be left. Trees leaning towards the stream would be retained over trees leaning away from the stream. In general, riparian reserves would be treated for density management / understory reduction with a target canopy closure of 50-60% for late-seral stands.

| Table 4. Riparian Reserve Widths and No Treatment Buffers | |
|---|---|
| **Stream Type** | **Riparian Reserve Width** |
| Fish-bearing streams | 330’ |
| Perennial streams & springs and intermittent streams | 165’ |
| Unstable or potentially unstable areas | 165’ |
| **Stream Type** | **No Treatment Widths** |
| Perennial streams, springs, fish bearing | 50’ |
| Intermittent streams | 25’ |

### Alternative 3

Fuel hazard reduction would occur on 105 acres in riparian reserves. Wildlife habitat enhancement and density management would occur on 144 acres along with 11 acres of young stand management in riparian reserves. Activities would include hand pile and burning, underburning, and slashing. All treatments retain overstory canopy by removing only smaller suppressed trees and encroaching brush.

### Alternative 4

Treatments in alternative 4 are similar to alternative 2. However, treatment areas would focus in young and homogeneous stands lacking structural diversity. There would be 56 acres of fuel hazard reduction, 203 acres of density management, 28 acres of wildlife habitat enhancement, and 11 acres of young stand management.

## 2.2.6 Roads

### Objective

The objective is to minimize permanent road construction, improve road drainage, and maintain existing roads at levels consistent with planned long term use of the road. The proposal also seeks to reduce road densities at the watershed scale where possible and consistent with the anticipated long term resource management needs. There is also the need to provide road systems that are safe for forest road travelers.

### Proposed Actions

In order to increase driver visibility and road user safety, trees and roadside vegetation presenting a hazard would be thinned and pruned along the curves of haul routes listed in the Appendix C. Pruning in order to achieve driver visibility would be favored over removal.

Hazard trees (dead and dying trees that lean toward the road and are sufficiently tall to reach the roadbed) would be felled and may be removed through the small sales program. Hazard trees in the riparian reserve may be felled and left in place for large woody debris.

Roads that route surface flow resulting in erosion and sediment transport to streams will be treated for drainage improvement (culvert work, etc.) as part of all action alternatives. Specific proposed road work (construction, maintenance, decommissioning, etc.) for all alternatives is listed in Appendix C and displayed on Maps 3, 4 and 5 (Appendix A).

All action alternatives propose maintenance on 19.28 miles, renovation on 5.55 miles and decommissioning on 1.25 miles of road. Additionally, alternative 2 proposes 0.89 miles of temporary spur road construction.

### 2.2.7 Recreation and Cultural Resources

**Objective**

The objective is to manage scenic, natural, and cultural resources to enhance visitor experience and meet their expectations as well as increase public awareness and appreciation of cultural resources through development of education and interpretive programs (RMP pp. 63, 71). To meet these objectives, trail work and interpretive displays describing the history of the area are proposed.

**Proposed Action - Alternatives 2, 3 and 4**

Recreational use in the project area occurs along historic ditches, trails and jeep roads. Signing, trailhead construction and interpretive panels are proposed in this project along with trail development. Approximately 9 miles of trails are proposed for maintenance or improvement in sections 27, 28, 33, and 34. Approximately one-half mile of new trail construction is proposed (Table 5).

Historic Ditches
Approximately 6.8 miles of historic ditches would be maintained as primitive foot trails. Generally, the lower berm along the ditch, which is up to 2' wide, would be used as the trail. Brush and vegetation would be cleared along the ditches. In areas where the ditch berm has been breached and the crossing is steep, wooden foot bridges would be built to cross the ditch berm. Conifers < 8" dbh would be cleared from the ditches if they pose a threat to ditch integrity. Historic ditches would be open only to foot traffic to protect ditch integrity. Interpretive signs regarding unique cultural features, and the importance of staying on the trail would be installed at trailheads and various locations along the trails (Appendix A, Map 7).

Trails, Closed Roads used as Trails, New Trail Construction
Approximately two miles of existing trails and closed roads would be maintained. Existing and newly constructed trails would have a 2' wide tread. New trails would be constructed using chainsaws, trail building machines, or hand tools. Some vegetation would be removed, primarily shrubs or small trees and hazard trees, and would be scattered below the trail to blend with the natural landscape or would be placed on decommissioned trails. New trails would be outsloped (3% grade) with rolling dips to facilitate drainage. Trails would be brushed 10' vertically and 4' on each side of the centerline. Trails would be open to non-motorized uses including hiking, horseback riding and mountain bicycle riding (Map 7).

Roads in sections 27, 28, 33 and 34 planned for use as haul roads would be closed after hauling is complete, and used as trails for hiking, horseback riding and mountain bicycle riding.

Off Highway Vehicles
All trails, historic ditches and closed roads would be closed to motorized vehicles, camping, hunting and campfires. These closures would be published in the Federal Register. In addition,

press releases and contacts with user groups would help inform the public of these closures and facilitate compliance.

Trailhead Construction

There are two locations proposed for trailhead construction, which would allow parking of approximately 5 vehicles at each trailhead (Map 7). Trailheads would be established in areas already utilized for parking/pull outs and would be leveled and rocked. Kiosks would provide maps, safety information and historic background information about the area and interpretive signs would be installed as funding allows.

Hazard Tree Removal

Hazard trees along trails would be felled and left on site. In concentrated pockets, some felled trees would be left on site but most would be cut up and the slash hand piled and burned. Along ditch trails, hazard trees would be felled away from the ditches.

**Table 5. Trail Development and Maintenance**

| Segment | Description | Length |
|---|---|---|
| A | Trail section 27 with reroute | 1.40 |
| B | North Osgood Ditch and portion of new trail | 0.80 |
| C | West Osgood Ditch to High Gravel | 0.60 |
| D | Logan Esterly Upper Ditch sections 27/34 to cutoff trail | 1.20 |
| E | Logan Esterly Middle Ditch Section 34 | 0.80 |
| F | South Osgood Ditch from High Gravel (inc trail) to FS line | 1.20 |
| G | Osgood Ditch to Cameron Mine | 0.60 |
| H | connector trail (Osgood to LE Upper) | 0.20 |
| I | Logan Esterly Upper Ditch Section 33/34 | 1.60 |
| J | connector trail (LE Middle to LE Upper) | 0.10 |
| K | New Trail section 33 | 0.60 |
| L | Existing Road/Trail between High Gravel and Osgood Cameron | 0.40 |
| **Total Length** | | **9.50** |
| **Trail Types** | | |
| Existing Trails | | 1.70 |
| Existing Ditches | | 6.80 |
| Existing Roads | | 0.4 |
| New Trail Construction | | 0.6 |
| **Total Length** | | **9.50** |

### 2.2.8 Area of Critical Environmental Concern (ACEC) and Research Natural Area (RNA)

Designation of an ACEC or RNA on BLM lands is a resource management plan level land allocation. It is not a designation that is made at the project planning level. If a nomination and subsequent assessment indicate that an area has high potential as an RNA or ACEC, final determination regarding its designation would take place during the next RMP planning effort. In the interim, activities would be limited and designed so as not to compromise identified values of a nominated area until they could be fully reviewed as a part of RMP planning effort.

#### 2.2.8.1 ACEC

A nomination for a Waldo-Takilma Area of Critical Environmental Concern (ACEC) was submitted by several interested parties. The nominated area is located primarily in the East Fork

Illinois watershed with a portion occurring in the West Fork Illinois watershed. The proposal is currently being evaluated under a separate process, as part of the Western Oregon Plan Revision.

2.2.8.2 RNA

An RNA is a type of ACEC. The objective of an RNA is to preserve, protect, or restore native species composition and ecological processes of biological communities (RMP p. 56). RNAs are available for short or long term scientific study, research, and education and will serve as a baseline against which human impacts on natural systems can be measured. The 70-acre old growth tanoak potential RNA (T34S, R8W section 34, unit 10A) is not currently being considered for RNA status. (See Appendix E: Alternatives considered but not analyzed in detail).

### 2.2.9 Special Forest Product (SFP) – Alternatives 2, 3, and 4

#### Objective

The objective is to provide a range of special forest products for sale/collection including but not limited to poles and firewood.

#### Description of Special Forest Product Activities

All special forest product harvesting would be done in a manner that promotes attainment of the broader stand's silvicultural prescription and vegetation / fuels treatment objectives and pertinent project design features (Section 2.3 below). All timber harvest units (See Tables B-1, B-2 and B-3) would be available for SFP harvesting / collection. Materials resulting from activities associated with fuel hazard reduction, wildlife habitat restoration and enhancement and young stand treatments that could be utilized would be made available for purchase. SFP harvesting would be contingent on access availability.

## 2.3 Project Design Features

Project design features (PDFs) are included in the proposed action for the purpose of reducing anticipated adverse environmental impacts which might stem from project implementation. The PDFs noted below would be integral to all action alternatives unless otherwise noted.

### 2.3.1 Logging Systems

#### 2.3.1.1 All Systems

All harvested trees would be limbed (≥ 3" diameter limbs) prior to yarding to reduce damage to the residual stand and minimize soil disturbance.

All natural surface landings constructed during the logging operation would be decompacted to a minimum depth of 18" and seeded/mulched with native grass seed and native or weed free straw upon completion of harvest and before the onset of the rainy season. Landings that would be used in the future would not be decompacted.

In riparian reserves, trees would be directionally felled toward approved skid roads. Riparian skid road construction would not occur within 75' of intermittent or within 100' of perennial streams. Priority for skid road selection would be those that have not recovered from previous

use. Site restoration treatments would be applied after yarding has been completed and would include such things as ripping/decompaction, water barring, seeding, tree planting and/or blocking as needed.

Unstable and potentially unstable areas (areas showing active movement and indications of past movement), would be assessed for the risk of future slides. These areas are considered riparian reserves (NWFP Standards and guidelines pp. C30-C31). In unstable areas, the objective is to maintain or improve root strength. Therefore, in unstable areas (such as slip plains, step benches, recent debris flows or debris slides) vegetation would not be treated. Potentially unstable areas may be treated (selective slashing, hand piling and slash burning) where long term root strength can be maintained or increased.

Tractor Yarding

To reduce ground disturbance and soil compaction, yarding tractors would be limited to the smallest size necessary. Tractors would utilize one end log suspension during skidding and would be restricted to approved skid trails. Existing skid trails would be used when possible. Tractors would be restricted to slopes <35%. Tractors would not be used when soil moisture content at a 4-6" depth exceeds 25% by weight.

Skid roads would be water barred as needed for slope and soil type. Main tractor skid trails would be blocked where they intersect haul roads and would be decompacted or water barred shortly after yarding is completed to reduce erosion. Skid roads would be used only during the dry season. If a skid road in a riparian reserve is used for more than one season it would be winterized (water barred, covered with debris, etc.). In areas proposed for planting (Appendix B), ripped skid roads would also be planted. Other areas would be allowed to revegetate naturally.

Cable and Helicopter Yarding

In cable units, step landings would not be permitted. Cable corridors would be located away from draws and would be water barred as needed based on the slope and soil type.

All landings, including fill slopes, would be located away from headwalls, draw bottoms and adjacent draw side slopes. Existing stable roads and landings in riparian reserves would be reused to minimize new road or landing construction. All natural surface landings constructed during the logging operation would be decompacted after use, except landings on rocky ground or those planned for future use. Landings would be seeded with native grasses, mulched with native, weed free straw, treated for effective drainage, or covered with slash following harvest and before the onset of the rainy season.

### 2.3.2 Seasonal Operating Restrictions

**Table 6. Seasonal Operating Restrictions**

| Location | Restricted Activities | Restricted Dates | Reasons / Comments |
|---|---|---|---|
| Entire project area | All logging and log hauling operations | Oct. 15 to May 15* | Erosion control. Dates may vary depending on weather, road surface, drainage, and soil moisture. |
| Entire sale area – ¼ to ½ mile around any raptor nest | All timber harvest activities, road construction and chainsaw operation. | Variable depending on the species | Timber Sale E-4 Special Provision |

| Table 6. Seasonal Operating Restrictions | | | |
|---|---|---|---|
| **Location** | **Restricted Activities** | **Restricted Dates** | **Reasons / Comments** |
| 1/4 mile radius around active spotted owl nest sites. | All timber harvest activities, road construction, chainsaw operation and prescribed burning | March 1 to June 30 (variable depending on nesting status) | Medford District RMP; Rogue River/South Coast FY04-08 Timber Sale Projects Biological Assessment and USFWS Biological Opinion (#1-15-03-F-511, 2003). |
| ¼ mile no line of site and ½ mile line of site around active bald eagle nest sites | All timber harvest activities, road construction, chainsaw operation and prescribed burning | Variable - January 1 to August 15 | Dates and restrictions depend on nest activity. Rogue River/South Coast FY04-08 Timber Sale Projects Biological Assessment and USFWS Biological Opinion (#1-15-03-F-511, 2003). |
| All harvest units and road construction ROWs. | Various activities depending on the species | Variable depending on the species | Restrictions only if special status species are located. (RMP; BLM 6840 Manual) |
| Entire project area | Fuel hazard reduction | Variable | Time fuel reduction treatments to reduce conditions that contribute to bark beetles in logging slash. |
| * An additional consideration would be made for continued road use and helicopter logging after rain events from October 15 to May 15 on some roads. Continued use would require roads that are well drained and have adequate surface stability (such as BST, crushed rock, grid roll rock, or pit run rock). The BLM would monitor road conditions during hauling, and road maintenance would be kept current with hauling. The affected area would be closed/blocked and weatherized if weather conditions change and hauling is suspended. | | | |

### 2.3.3 Special Status Plants and Noxious Weeds

For special status species, the size of the protection buffer would be determined on a case-by-case basis, depending on the species and its habitat requirements but would be a minimum of a 20' radius for sensitive species. Burns in areas containing special status plant species would follow prescriptions that would result in cool burns which would minimize potential damage to plant populations. Prescribed fire operations would be done in manner which strives to reduce or eliminate burning through identified special status plant populations depending on the adaptability of each species to fire.

Project design criteria (PDC) for T&E listed species (*Fritillaria gentneri* and *Lomatium cookii*) are provided in the FY04-08 Rogue River/South Coast Biological Opinion:

- A minimum 25' radius buffer. No mechanized activity would occur in the buffer when plants are growing. Buffers can be treated manually (burning, hand brush/tree removal, sowing adapted native grasses etc.) during the dormancy period (September-February) for activities that benefit the species.
- Tree falling, yarding or anchor tree location would occur in or across buffers.
- Construction of new landings would be at least 300' from known sites.
- Proposed logging road location, including temporary haul roads, would be surveyed and populations protected by a minimum 100' radius buffer. Use of existing roads within 100' of occurrence is allowed.
- Firewood collection would not occur in buffers.
- Cut material would be piled outside buffers.
- No tree planting or mechanical scalping would occur within 75'of the buffer edge (100' from occurrence).

Noxious weeds would be treated using an integrated pest management approach (RMP p. 92). Management objectives are to contain or eradicate populations of *Cytisus scoparius* (Scotch broom) and *Centurea debeauxii* (meadow knapweed). Populations of *Rubus discolor* (Himalayan blackberry) and *Cirsium vulgare* (bull thistle) would be contained using appropriate methods based on species and conditions under the guidance of the Medford District Integrated Weed Management Plan (PA-OR110-98-14). All treated noxious weed populations would be monitored for treatment effectiveness.

Seed and straw used would be native species and weed free.

Heavy equipment would be cleaned prior to moving onto BLM lands and when moving from known noxious weed areas into weed-free areas to remove seeds and mud containing seed from equipment undercarriages.

### 2.3.4 Wildlife

Activities that produce loud noises above ambient levels would not occur within specified distances of any nest site or activity center of known spotted owl pairs and resident singles between March 1 and June 30th as described in the table above.

All active red tree vole nest sites will be buffered according to Management Recommendations in place at the time of the decision.

All snags ≥ 16" DBH would be reserved from cutting unless they pose a safety hazard, in which case they would be left in the unit and a replacement standing tree would be identified for retention.

Where feasible, snag patches (6 or more snags) would be buffered by one half to one site tree height to protect the snag patch from damage during logging operations.

Prior to prescribed burning, duff would be pulled away from the base of snags to reduce the chance of losing them during burning.

Coarse woody debris (CWD) would be retained and protected from disturbance to the greatest extent possible during logging, burning and other project activities.

### 2.3.5 Fire and Fuels Management

Prescribed burning would be consistent with the Oregon Department of Forestry's Smoke Management Plan and the Department of Environmental Quality's Air Quality and Visibility Protection Program. Additional measures to reduce smoke emissions would include rapid mop-up, burning with lower fuel moisture in smaller fuels to facilitate quick and complete combustion, burning with higher fuel moisture in the larger fuels to minimize consumption and burn out time, and covering hand piles to permit burning during the rainy season when atmospheric mixing and smoke dispersal are more likely.

All prescribed burn areas with sensitive plant species would be burned under the weather, fuel conditions or season that minimizes impacts on plant reproduction and active growth. Low intensity (winter/spring) under burning could occur after mechanical treatment to reduce fuel

hazard. Fires would be allowed to back into riparian reserve no-treatment areas, but no ignition would take place within 50' of streams. Prescribed burning would also follow all PDFs for cultural resources.

Patrol and mop-up of burned areas, which may include use of a helicopter and water bucket, would help prevent reburn or fire escape.

For biomass extraction on slopes <35% slope, low impact ground based equipment such as pickup trucks, all-terrain vehicles, small tractors or rubber tire skidder may be used. Skidding or trailer forwarding by draft animals will also be acceptable. Skid roads would be ≥ 75' feet apart. In the nominated ACEC and riparian areas, ground based extraction would limited to existing skid trails and roads.

Where appropriate, biomass extraction would be performed by low level aerial cable yarding systems which offers one end log suspension for at least 80% of the turns. This method of cable yarding is designed to offer maximum equipment mobility while still allowing the operator to cover a large area of ground per set-up with lateral yarding capabilities. Equipment of this type would generally be used within 200' of roads with slopes >35%.

### 2.3.6 Roads - Construction, Improvement, Decommissioning, Closure

When roads would be used for more than one season, temporary roads or roads slated for decommissioning would be winterized and treated for erosion control (water barred, seeded, mulched, etc.). Temporary blocks would prevent wet season use prior to decommissioning.

All new road construction and improvement would be done at the minimum standard appropriate for the intended long term use of the road. New roads would have a subgrade no wider than 17', with a running surface no wider than 12'. All roads used during the wet season (October 15 through April 15) would be surfaced with at least 6" of crushed aggregate. Roads proposed for decommissioning that are needed to support the prescribed burning/fuel reductions would be scheduled after burning is complete. During the wet season, these roads would be treated for erosion control (water bars, seeding, mulching) or slash where needed, as mentioned above for skid roads under tractor logging). Where needed, temporary blocks would be placed to eliminate wet season use.

All temporary spur roads would be constructed and obliterated in the dry season. Temporary roads would be winterized by installing water bars or water dips, seeding, mulching and surfacing the road. Roads would be replanted after obliteration.

To ensure driver visibility, thinning along roads would be favored over removal.

Dust from log hauling would be abated as necessary to promote safety and road longevity. Dust abatement may include the application of water or lignin, or reduced vehicle speed.

### 2.3.7 Recreation and Cultural Resources

The project area has open, limited and closed categories for off-highway vehicle (OHV) use (RMP p.109). If resource damage from OHV use is documented steps will be taken to control the use through signing, barriers, monitoring and increased law enforcement activity.

There are 27 recorded cultural sites in the project area which would be buffered prior to project implementation. No fire line construction, prescribed burning, or hand piling/burning would occur within the flagged boundaries of the recorded cultural resources (Table 6). Light treatment to protect historic ditch trails and promote their use for hiking is proposed.

**Table 7. Recreation and Cultural Resources Protection and Enhancement**

| Site Name/OHV Designation | Nat'l Reg. Historic Places | Project Design Features Alternative 2, 3 and 4 |
|---|---|---|
| Logan/Esterly Upper Ditch/ Limited (IVBEA) and Open | Listed | 50' buffer each side of the ditch where vegetation treatment is proposed (<30% of the vegetation in the buffer would be cut-see fuels prescription) |
| High Gravel Mine/Limited (IVBEA) | Listed | 25' no treatment buffer from the top of the hydraulic cut. |
| Plataurica Mine/Limited (IVBEA)and Open | Listed | Biomass utilization will occur in the boundaries of this site. The proposed treatment will incorporate PDFs to protect the integrity of the site. Follow PDFs of the Logan/Esterly Upper Ditch, which crosses the site. |
| Allen Gulch Town Site/Limited (RR) and Open | Eligible | No treatment in the buffered town site. |
| Allen Gulch Mill/Limited (RR) | Listed | No treatment in the buffered town site area. |
| Allen Gulch Diggings/Open | Eligible | No treatment in the buffer. |
| Esterly Placer pit #2 Llano de Oro Mine/Closed | Listed | No treatment in the buffer. |
| Lily Ridge Prospects/Open | Ineligible | None (no treatment proposed). Fence or cover open vertical shaft for safety. |
| Lily Mine/Open | Ineligible | None (no treatment proposed). |
| Little Elder Cabin and Barn/Limited (RR) | Ineligible | No treatment in the buffer. |
| Little Elder Lithics/Limited (RR) | Eligible | No treatment in the buffer. |
| Lantern Dump/Closed (Federal Register) | Ineligible | No treatment in the buffer. Fall trees away from buffer. |
| Takilma Prayer Circle/Open | Ineligible | Not historic (less than 50 years old). |
| Seven Fenders Prospect & Refuse/Closed (Federal Register) | Ineligible | No treatment in the buffer. Fall trees away from buffer. |
| Bare Bottom Flat/Closed (Federal Register) | Ineligible | No treatment in the buffer. Fall trees away from buffer. |
| South Section 23 Ditch/Closed (Federal Register) | Unclear | Ditch crossings using mechanized equipment/yarding would require approval from a cultural resource specialist. |
| Nor East Prehistoric Camp Site/Closed (Federal Register) | Eligible | No treatment in the buffer. Fall trees away from buffer. |
| Elder Ridge Ditch/Limited (RR) | Ineligible | Fall trees away from ditch. Ditch crossings using mechanized equipment/yarding would require approval from a cultural resource specialist. |
| Sawmill Ditch/Closed (Federal Register) | Ineligible | Fall trees away from ditch. |
| St. Patrick's Catholic Cemetery/Closed (IVBEA) | Listed | No treatment within 100'of the cemetery. Fall trees away from site. |
| Osgood Ditch/Limited (IVBEA and RR, Open) | Listed | 50' buffer (Removal of less than 30% of the vegetation in the buffer) Osgood Ditch area along the proposed Waldo FMZ: 25' buffer on each side of the ditch |
| Cameron Mine/Open | Listed | None (no treatment is proposed) |
| Logan/Esterly Middle Ditch/ Limited (RR), Open | Listed | 50' buffer (<30% of the vegetation in the buffer would be cut-see fuels prescription) Close ditch to OHVs. |
| Logan Wash Ditch/Closed (Federal Register) | Listed | Ditch crossings using mechanized equipment/yarding would require approval from a cultural resource specialist; |
| Sailor's Gulch Diggings/Limited (IVBEA) | Eligible | No treatment or equipment in the buffer**.** |

| Table 7. Recreation and Cultural Resources Protection and Enhancement | | |
|---|---|---|
| **Site Name/OHV Designation** | **Nat'l Reg. Historic Places** | **Project Design Features Alternative 2, 3 and 4** |
| Waldo American Indian Use Area/Open | Ineligible | Not historic (less than 50 years old). |

In areas where biomass utilization is proposed within the boundaries of a listed National Register site, the resource area archaeologist, in consultation with the Oregon State Historic Preservation Office, will complete necessary documentation to assure that the characteristics that make the site eligible for inclusion in the National Register are not adversely impacted by the proposed activity. Additionally, if located within the boundaries of a National Register site, the archaeologist will collaborate with the fuels lead in layout of skid trails required for the removal of biomass.

Timber would be felled away from cultural resource site buffers, including unflagged historical ditches as identified on a map. Any ditch crossings which would impact the integrity of the ditch (including large mechanical equipment, cable yarding, etc.) would require prior approval from an archaeologist to prevent site degradation or eligibility for the National Register of Historic Places. These measures could include rebuilding/re-contouring any part of the ditch that may become impacted from the crossing. Historic ditches would be open to foot traffic only to preserve the integrity of the ditches.

If unrecorded cultural sites are found during project implementation, a cultural resource specialist would be informed and provide appropriate protection measures.

### 2.3.8 Visual Resources Management

The project area consists of VRM Class III lands. Class III objectives are to manage lands for moderate levels of change to the characteristic landscape. Management activities may attract attention but should not dominate the view of the casual observer. The following design features would be followed for all VRM III units:

In timber harvest units:

- Use irregular clearing shapes
- Mimic size and shape of existing openings or meadows in the characteristic landscape.
- Feather/thin the edges of cleared areas to reduce strong lines of contrast and appear more natural. Retain a mix of tree/shrub sizes and species along edges.
- Retain most large crowned trees and a variety of tree sizes and shapes to ensure that the resulting visual canopy does not distract from the surrounding landscape.
- Feather and scallop edges of openings around legacy trees.
- Avoid fan shaped yarding corridors

In fuels reduction units:

- Avoid straight edges when building fire lines.
- Rehabilitate fire lines by pulling in berms, covering with vegetation or water barring when necessary.
- Where possible, tie fire line into existing natural fire breaks.

For road construction:

- When multi-layered canopies occur adjacent to the road, leave dominant trees in each canopy layer to aid visual screening.
- Seed and mulch cut banks to blend with the surrounding area
- Plant shrubs and/or conifers that belong to the Douglas-fir and pine plant series.

## 3.0 Environmental Consequences

Current conditions in the project area result from a multitude of natural events and human actions that have taken place over many decades. Cumulative effects are defined as the, "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions" (40 CFR § 1508.7).

In response to public interests and comments regarding multiple BLM projects in the Illinois River Valley, the following presents an overview of proposed BLM projects. The Illinois River Valley is a 633,517 acre subbasin to the Rogue River. Within this subbasin, BLM has 6 proposed or ongoing projects (Deer Creek Salvage, Althouse Sucker, West Fork Illinois River, East Fork Illinois River, South Deer, Tennessee Lime, Anderson West). Collectively the BLM projects propose 3,786 acres of commercial thinning/special forest products/density reduction, representing 0.5% of the Illinois River subbasin. Acres for the Althouse Sucker project have not yet been estimated. There are no clear-cuts proposed. Forty-one acres of structural retention are proposed, representing 0.006% of the Illinois River subbasin. Fuel reduction and wildlife habitat restoration is proposed on approximately 6,645 and 2,725 acres, respectively. Additionally, a net of 0.3 miles (0.9 acres) of new road construction would be added to the transportation road system, increasing road surfaces by 0.0001%. These figures (see below) are based on the alternatives with the greatest level of acres treated. As decisions have not been made on several projects, the figures represent the greatest level of potential treatment.

***Potential treatments in the Illinois River Valley subbasin***

| | **Acres** | **Percent** |
|---|---|---|
| East Fork Project | 1,909 | 0.3 |
| Watershed CT / SFP / DR* | 3,786 | 0.5 |
| Watershed structural retention | 41 | 0.006 |
| Fuel hazard reduction | 6,645 | 1 |
| Wildlife habitat restoration | 2,725 | 0.4 |
| Road construction | 0.9 | 0.0001 |

*CT = Commercial Thin; SFP = special forest products; DR = density reduction

Current or proposed BLM timber sales in the Illinois River watershed include approximately 348 acres in the Anderson West project, 547 acres in the Deer Mom project, 378 acres in the South Deer project and potentially up to 900 acres in the Althouse-Sucker Landscape Management project. Additionally, the Forest Service is currently developing a pre-commercial thinning project and is proposing to treat approximately 1,150 acres of young stands across the East Fork Illinois 5$^{th}$ field watershed over 10 years (~2% of the watershed). No additional timber sale activities on federal lands are projected to occur in the watershed in the next five years.

Scoping for this project did not identify a need to exhaustively list individual past actions or analyze their environmental effects in order to fully analyze the effects, including cumulative, of this project's action alternatives. A description of current conditions inherently includes the effects of past actions and serves as a more accurate and useful starting point for a cumulative

effects analysis than by "adding up" the effects of individual past actions. "Generally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." (CEQ Memorandum 'Guidance on the Consideration of Past Actions in Cumulative Effects Analysis' June 24, 2005.) Cataloging past projects and their individual effects would not be useful in discerning the contribution of the incremental impact of the project's action alternatives. However, cataloging and analyzing other present and reasonably foreseeable actions relevant to the effects of the proposed action *is* necessary and is described below. By comparing the "no action" alternative (current condition) to the action alternatives, we can discern the "cumulative impact" resulting from adding the "incremental impact" of the proposed action to the current environmental conditions and trends.

Similarly, unless addressed specifically, the following were found not to be affected by the proposed action or alternatives: air quality; Native American religious concerns; prime or unique farmlands; floodplains; wild and scenic rivers; and wilderness.

## 3.1 Soil and Water

### 3.1.1 Affected Environment

The East Fork (EF) Illinois River 5th field watershed contains three 6th field subwatersheds including Lower and Upper EF Illinois and Dunn Creek. The California portion of Dunn and Upper EF is a tier 1 key watershed. The project area lies in the Lower EF Illinois subwatershed (30,800 acres) and includes 1,909 acres or 6% of the 6th field watershed.

**Soils**

There are two primary soil groups in the Lower EF Illinois River and project area. The Dubakella and Pearsoll soils, derived from serpentine and ultramafic rock, are moderately deep and well drained. They have low productivity due to high levels of magnesium and low calcium. The Josephine County Soil Survey (USDA 1983) recommends designating skid trail placement and operating in the dry season to minimize compaction and erosion. The soils are susceptible to slumping when roads are constructed on steep slopes.

Derived from sedimentary and igneous rock, the Josephine and Speaker soils are deep and well drained, well suited for mixed conifer forests and are productive. The Cornutt series is formed from sedimentary and igneous rock but contains ultramafic material which reduces productivity.

Vegetation on the Josephine and Speaker soils consists mainly of Douglas-fir, ponderosa pine, madrone, shrubs and grasses. On the ultramafic soils, vegetation consists of ponderosa pine, Jefferey pine, madrone, shrubs and grasses. As the percent of serpentine influence increases, stands become more open and dominated by Jefferey pine and brush. The unique serpentine-igneous rock soil assemblage in sections 34 and 35 was identified as a value meeting criteria for ACEC nomination.

Mining in Allen, Sailor, and Scotch Gulch have greatly altered soil conditions. Mine tailings in the channel and floodplains altered channel patterns and decreased water holding capacity.

## Hydrology

Peak Flows

Peak flows vary by year and depend on annual rainfall which ranges from 45-100" across the watershed. Large peak flows of record such as 1955, 1964, 1974, and 1997 resulted from rain on snow events.

In 1999, there were 698 CFS in water rights for industrial, mining, and agricultural uses. Approximately 5,300 acres of agricultural land, predominantly pasture grass and hay, is irrigated with EF Illinois River water. While not quantified, hundreds of private wells pull groundwater for domestic and irrigation uses; groundwater extraction exacerbates low flow conditions. The watershed also supplies source water for communities and domestic beneficial uses. With the heavy private demands on water, summer flows have decreased.

Roads route subsurface and surface flow to streams via ditches and culverts (Wemple et al. 1996, Harr et al. 1975). Two percent (742 acres) of the Lower EF Illinois 6th field subwatershed is roaded, including private and federal roads. At these road levels, elevated peak flows in the EF Illinois and tributaries are very unlikely. For comparison, (Jones and Grant 1996, Jones 2000) found no statistically significant increases in peak flows attributed to roads when roads occupied 6% of the basin. Similarly, Wright (1990) and Ziemer (1981), found no changes to the hydrograph when roads occupied 5% of the basin. Road effects on peak flows were detectable when 12% of the watershed was roaded (Harr et al. 1975).

There are, however, individual roads in sections 24, 34 and 35 which are eroding and routing water and sediment to the stream network. The survey found that a small percentage of roads are responsible for the majority of surface flow interception and sedimentation. Luce and Black (1999), similarly, found that a few roads generated the majority of sediment.

Timber harvest and associated reduction in evapotranspiration (plant uptake of water) has also been linked to increased flow volume. Reduced evapotranspiration leads to higher soil moisture, resulting in a greater percentage of precipitation available for surface runoff. In the Lower EF Illinois, a combination of past federal land harvest activities, rotational harvest on private timber lands, and fire suppression are primarily responsible for changes in forest vegetation.

Approximately 48 acres, or 0.8% of the project area, is in early seral condition. The brush, grass/forbs, and non vegetated vegetation classes are a result of natural, low productivity serpentine soil. Similarly, the majority of the pole condition class is the jefferey pine plant series influenced by serpentine soils. In the Lower EF Illinois subwatershed, BLM has harvested 85 acres since 1980, representing 0.3% of the subwatershed. At the EF Illinois 5th field watershed scale, federal land harvest has occurred on 1,870 acres, representing 3% of the watershed. Harr et al. (1979) found hydrologic recovery of vegetation occurs in 25-30 years. Jones and Grant (1996), documented significant hydrologic recovery 6 years following clear cutting. Most stands in the project area and in the watershed have 20 years of regrowth and are estimated to be 50-75% hydrologically recovered. As stated in the RMP, private forest lands are assumed to be in early to mid seral condition based on a harvest rotation of 60 years.

Given the small amount of area in roads, low acres in early seral condition, low volume of harvest, and recovery of past units, alterations in stream flow due to past harvest and road activities are very unlikely. Evaluation of stream gage data for the EF Illinois at Takilma gage

(1929-1991) and the EF Illinois at Kerby gage (1961-2003) indicates no trend in increase peak flows or annual yield.

Water Quality

Floodplains in the lower gradient valley bottoms of EF Illinois, Elder, Little Elder, and Khoeery Creeks have been cleared for agriculture, mining and development. Consequently, shade values along the EF Illinois average 15% (USDI 2000). This lack of shade on lower tributary streams and the mainstem combined with irrigation and water use led to the Oregon Department of Environmental Quality's (ODEQ) listing of the EF Illinois as water quality limited for water temperature and flow modification.

In the moderate to high gradient reaches, fire suppression combined with past harvest have led to dense, slow growing riparian stands. High density stands have been identified in the Little Elder and Khoeery Creeks as well as Allen and Scotch Gulches. While past harvest has fragmented riparian habitats, tributary streamside shade on BLM land in the EF Illinois is 97% (ODEQ 2002). For thermal protection of cold water beneficial uses, ODEQ considers full recovery of shade at 80% (USFS, USDI 2004).

Stream Channel

The mainstem of the EF Illinois River, from the mouth up to Long Gulch and all tributary confluences, has been altered by roads, agriculture and housing development (USDI 2000). ODFW surveys found that 66% of the channel banks in the EF Illinois are actively eroding. Loss of floodplains and riparian vegetation combined with large flood events, notably 1964, led to accelerated erosion. Hydraulic mining throughout the watershed washed hillsides and destabilized channels leading to increased sedimentation. To a lesser degree, roads in the watershed, particularly those with poor drainage, have increased sediment loading.

The Longwood Fire and salvage reduced large wood debris and channel stability while increasing sediment routing in the Long and Bybee Gulch tributaries. Approximately 50% of Bybee Gulch and all of Long Gulch have been depleted of current and near future supply of large wood (USDI 2000). Slides and debris flows from Dunn and Chicago Creeks during the 1964 flood rapidly delivered large volumes of sediment into the channel network.

The areas of the stream network most sensitive to elevated sediment lie in the low gradient valley bottoms where, due to reduced stream flow velocities, sediments deposit. In the low gradient reaches of Dunn and EF Illinois, USFS and ODFW surveys found substrate dominated by gravel and cobble. Similarly, BLM stream surveys found only 5 % of streams with fine sediment embeddedness. Other than in Allen Gulch with very heavy mining activity and poor road conditions, all surveys indicates that fine sediment is not limiting aquatic conditions and fish production.

### 3.1.2 Environmental Consequences

### Alternative 1 – No Action

Conditions and trends described above would continue. Severe fire risk would increase. If a fire event were to occur, water and soil runoff would increase. The amount would depend on the intensity and extent of the fire. High intensity fire in the riparian zone would decrease stream shade and large wood recruitment potential.

**Alternative 2**

Alternative 2 proposes a combination of forest thinning, fuel hazard reduction, and young stand management. Table 2 displays the activity, acres, and percent of the sub-watershed proposed for treatment.

Hydrology

As displayed in Table 2, only 5.5% of the watershed would be treated. All vegetation treatments maintain an overstory and a mosaic of understory vegetation. At least 40-60% canopy cover would be maintained in harvest units. Wildlife and pine restoration sites would maintain a lower canopy to meet wildlife habitat objectives. There would be no clearcuts or regeneration harvest creating large canopy openings. Therefore, vegetation transpiration at the stand level would not be reduced to levels leading to increased runoff potential.

Prescribed fire would be a low intensity burn, protecting soil productivity. Underburning and handpile burning would leave bare soil areas on less than 7% of the treated area. Bare soil conditions would be fragmented surrounded by unburned ground, preventing concentration of runoff. It is expected that one year after treatment, grasses and forbs would return. Tree thinning and low intensity under burning would retain a mix of hardwoods and conifers, organic duff layer, leaf litter, and coarse wood debris. Collectively these forest components provide nutrients, bacteria and fungi decomposers, and mycorrhizae to maintain long term site productivity. Additionally, fuel treatments would occur over a ten year period, distributing activity over time.

No opening would be created in the transient snow zone. Therefore, peak flow enhancement from rain on snow events would not occur.

There would be one mile of temporary spur roads built, adding 1.8 acres of soil compaction (Appendix A, Maps 3 and 5). Road construction would create short term erosion. All temporary spurs would be decommissioned following use. No spurs would cross a stream or enter a riparian area. Therefore, there would be no mechanisms delivering water or sediment to the stream network.

Soil Compaction and Productivity

Six half acre landings would be constructed along existing roads and located away from streams and riparian areas. Ground based harvest is proposed on 408 acres. Skid roads would be designated away from creeks and drainage features. Based on skid road spacing of 150', approximately 24 acres of skid road would be developed during operations.

Skyline cable logging systems typically cause less compaction then ground-based systems, but can still create compaction and soil disturbance. Klock (1975) found skyline systems disturbed less than 3% of the units. Amaranthus (1983) found that cable yarding systems created bare soil conditions on 8-14% of the area. However, half of the units observed during monitoring did not have statistically different levels of bare soil conditions compared to pre-harvest conditions. Additionally, the treatments included removal of all logs >8" and there were no provisions to protect soils. The proposed action would maintain approximately 40-60% canopy cover, designate corridor spacing, and use one end log suspension. Based on the greater retention of vegetation compared to that described in Amaranthus (1983) and PDFs, soil disturbance would be less than 8%. Using a conservative estimate of 5% (an average of Klock (1975) and Amaranthus (1983)), less than 9 acres out of 111 acres proposed for cable logging would be

disturbed. While disturbance does not imply compaction, given uncertainties of compaction levels, all disturbed acres are assumed to be compacted.

The project identified 614 acres of potential biomass removal. Prescribed treatments are intended to reduce hazardous fuels while utilizing the biomass to benefit the local economy. In riparian areas and in sections 34 and 35 (nominated as an ACEC for soil assemblages) there would be no additional soil disturbance as existing skids trails and those developed for commercial entry (described above) would be utilized. Outside riparian areas and sections 34 and 35, there are 334 acres of potential biomass removal. Actual treatment acres would likely be fewer due to concerns for safety and economic viability. Hence, 334 acres represents the maximum level of treatment.

Due to smaller machinery typically used for biomass removal, skid roads would be designated approximately 75' apart. With smaller equipment, Amaranthus (1997) found an increase in bulk density (measure of compaction) of 5-7%. Region 6 of the Forest Service identified detrimental compaction when bulk density increased 15%. At a skid trail spacing of 75', with the caveat that existing skid roads and those developed for commercial sale would be used, soil displacement is estimated to be 32 acres. Detrimental compaction (bulk density >15%) is not expected on the 32 acres based on the findings of Amaranthus (1997). However, given uncertainties with equipment and operation techniques, 50%, or 16 acres, of the disturbed soil associated with small equipment is assumed compacted.

Amaranthus (1996) found ground-based harvest reduced soil productivity through compaction and loss of organic matter. However, Powers (2004) found that compaction did not universally reduce productivity. Cumulatively, temporary spur roads, ground based harvest, landings, cable system harvest, and biomass removal would potentially add a maximum of 53 acres of compaction, representing 0.2% of the Lower EF Illinois River subwatershed. Given the conflicting science, loss of productivity due to compaction is uncertain. Therefore, although not expected, loss of productivity is assumed for all acres.

In addition to compaction, 16 acres of soil would be disturbed. Powers (2004) found that removing all surface organics had neither an appreciable affect on carbon or nitrogen levels, nor an impact on vegetation reproduction. Loss of productivity on disturbed soils is not expected due to maintenance of physical properties of pore space allowing plant root penetration and water and nutrient infiltration as supported by the findings of Powers (2004). Additionally, retention of brush, hardwoods, down wood, and conifers, which collectively retain forest components that provide nutrients, bacteria and fungi decomposers, and mycorrhizae, would maintain long term productivity.

Less than 2% of the area nominated as an ACEC would have soil compaction or displacement. This disturbance would not alter the unique soil assemblage (juxtaposition of serpentine and igneous derived soils). Soil types and location on the landscape would remain. Therefore, the relevant and important soil values would be maintained.

Compacted soil may pond water during high intensity rainstorm events. With riparian protection buffers, slope limitations and no skid roads leading to creeks, the potential for delivery of water and any entrained sediment from compacted/disturbed soils to the stream network is extremely low.

Sediment

The project proposes 24 miles of road maintenance and drainage improvement, including 1.2 miles of decommissioning. Associated with road maintenance is 0.5 miles of road side ditch clearing. Luce and Black (1999) found no significant increase in erosion when only the road tread was treated; however statistically significant erosion occurred when road ditches were bladed. Sediment delivery to streams from road-ditch renovation would primarily occur at road-stream crossings in years one and two following activity. Luce and Black (2001) observed an 87% decrease in erosion and sediment transport from roads in years one and two following road maintenance activities. Ditch clearing would not occur within 50' of stream crossings and would occur in the dry season, reducing potential delivery of sediment to the channel system. The short term inputs may create isolated pockets of fine sediment deposition immediately (5-100') below culverts. During high flows, the introduced sediment will become an immeasurable fraction of the system sediment load and would not be detectable at downstream locations. A long term reduction in sedimentation and altered flow routing would be expected following road drainage improvement and decommissioning.

Similar to the findings of Luce and Black (1999), field reconnaissance in EF Illinois found that a few roads were responsible for a majority of sediment input to the channel system. Wemple (2001) also acknowledges that not all roads are equal in function or effects. The few roads identified as modifying flow routing and sedimentation in the project area are proposed for maintenance or renovation (Appendix C).

Further work is proposed on Sherman Road (40-8-35) and Allen Gulch. Allen Gulch Road would be rocked in riparian areas. Culverts would also be upgraded or removed. Road improvements would be done in the dry season according to PDFs, minimizing sediment inputs. Given the current sediment production from roads, only slight increases are expected as the road maintenance activity generating the sediment would also immediately decrease existing erosion. The small activity generated sediment would be short term, lasting the first few storms or one to two years following maintenance. After year two, sediment rates would drop below current levels due to road improvement, resulting in a long term sediment reductions. Past large scale disturbances in Allen Gulch have altered watershed processes of riparian development, hillslope stabilization, runoff patterns, and in-channel scour and fill cycles. Given the dominate disturbances controlling current channel conditions, the short term increase in sediment would not alter channel conditions, or noticeably increase turbidity or percentage of fine sediment.

Sherman Road treatments would include upgrading three cross drains and one channel culvert. Culvert upgrades would add sediment to the road maintenance described above. The same road maintenance activities generating short term sediment would immediately reduce current chronic road erosion. Inputs would be isolated below culverts and short term, lasting through the first few storm events, or 1-2 years. After year two, the improved drainage and hydrologic function would reduce sediment production from current levels.

Riparian

Alternative 2 proposes thinning and fuel reduction activities in the riparian zone. The riparian zones identified for treatment have over dense stands with consequent reduced stand resiliency and growth rates. In riparian areas that are over stocked, thinning will benefit water quality and aquatic conditions. The Sufficiency Analysis for Stream Temperatures (USDA, USDI 2004), the EF Illinois Watershed Analysis, and the NWFP recommend thinning and fuel activities in riparian area to increase vigor and resiliency.

Stands identified for thinning treatments currently have a high (>80%) canopy closure. A 50' no treatment zone would maintain primary shade. Thinning in the riparian zone beyond 50' would reduce canopy closure to 50-60%, with the expectation that within 10 years canopy closure would increase to 60-70%. The Sufficiency Analysis for Stream Temperatures (USDA, USDI 2004) recommends that vegetation treatments not reduce canopy cover below 50% to protect riparian site conditions.

Fuel reduction treatments focus on removal of understory brush and small diameter trees which afford no shade to the stream. Prescribed fire would also occur in the riparian areas. The prescribed fire would be low intensity, designed to create a mosaic vegetation pattern, thereby preserving existing shade.

Other than along the EF Illinois mainstem, stream shade on BLM managed riparian zones in the Lower EF Illinois subwatershed is 96%. Project implementation would not reduce streamside shade along any stream reach. Nor would the project reduce large wood recruitment potential. Rather, tree growth rates would increase in response to density reduction. Thus, time required to achieve stand structure with potential to deliver large instream wood would decrease. The project is in full compliance with the Aquatic Conservation Strategy (ACS).

Cumulative Effects

Within the Lower EF Illinois subwatershed, reasonably foreseeable projects include a National Forest plantation thin project consisting of 1,150 acres of thinning across the EF Illinois 5$^{th}$ field watershed. Over a ten year period, it is anticipated that <2% of the watershed would be thinned under this project. On private lands, rotational harvest is assumed to maintain forest conditions in an early to mid seral condition (USDI 1995).

All forest thinning and fuel reduction activities in the EF Illinois project would retain an overstory and a mosaic of understory vegetation, preserving evapotranspiration processes. Spur roads constructed will not cross stream channels and would be decommissioned following use. As a result, there would be no increase in water availability and no increase in routing mechanisms accelerating water delivery to streams. Therefore, there would be no increase to peak flows at the project, 6$^{th}$ field or 5$^{th}$ field watershed scales.

In total, alternative 2 would add approximately 53 acres of compaction. However, biomass removal, accounting for approximately 50% of the compacted acres, would be conducted with smaller machinery which has been shown not to create detrimental compaction (Amaranthus (1997), Powers (2004)). The maximum level of compacted acres represent a very small decrease in infiltration across the watershed (<0.2%). Importantly, the 53 acres of compaction would be highly distributed across the landscape avoiding loss of site productivity and concentrated runoff. No spur roads or skid trails would cross a drainage feature. Riparian buffers would be implemented in all units. Therefore, there would be no routing mechanisms from the compaction disturbance site to the stream network.

Isolated short term sedimentation from road maintenance activities would become immeasurable in downstream stream reaches. Long and short term reduction in sediment delivery to streams is expected from road drainage improvement. Project activities maintain streamside shade and large wood recruitment potential.

The project maintains watershed sediment and water runoff processes and riparian function. In many cases riparian vegetation vigor would improve and road related sediment would be

reduced, leading to long term improvement of processes and local channel conditions. Therefore, there are no anticipated cumulative effects to either the project area, EF Illinois 6th field sub-watershed, Illinois River 5th field watershed or to the Illinois Basin.

**Alternative 3 and 4**

There are fewer acres of treatment proposed in alternative 3 than under alternative 2 (Table 2). Under alternative 3 there would be no temporary spur construction or riparian reserve entry. Alternative 4, similar to alternative 2, would have temporary spur road construction but fewer tractor acres, resulting in fewer compaction acres. Based on the discussion and reasoning presented under alternative 2, there would be no measurable effect to water quality and channel conditions as a result of implementing alternatives 3 or 4. Similarly, there would be no cumulative effects to the project, 6th field, 5th field or basin watershed scales.

## 3.2 Vegetation

### 3.2.1 Affected Environment

Current vegetation in the project area is a result of topography, soils, natural disturbances, harvesting, mining and agricultural/residential development. Ownership patterns and use are the primary drivers for current and future vegetative trends. These include but are not limited to: residential/agricultural use in the lowlands, rotational harvest on private timber lands, BLM checkerboard ownership supporting multiple uses, and a high percentage of Forest Service lands in Late-Successional Reserves. Approximately 7-13% (4,111 to 7,708 acres) of the East Fork 5th field watershed classifies as agricultural or wooded residential.

Data on plant series (Table 8) and Vegetation Condition Class (Table 9) is for BLM and non-BLM lands in the portion of the 5th field East Fork Illinois River watershed located in Oregon. Plant series and vegetation condition class is a data layer produced and maintained by the Grants Pass Resource Area. It includes 5,044 acres (8.8% of the watershed) of BLM land, and 14,639 acres (25.4% of the watershed) of non-BLM ownership. Since this data is only available for lands in Oregon, the watershed analysis provided vegetation information for the 36,688 acres of Forest Service land in Oregon and California. There are approximately 1,222 acres of private ownership in California for a watershed total of 57,593 acres (USDI-USDA 2000).

Port-Orford cedar is found in the project area. However, the POC risk key analysis (available as part of the project record) determined that the POC population would not measurably contribute to meeting resource management objectives. Therefore, no POC specific project design features are necessary or required to protect the population.

**Plant Series**

The forested/non-serpentine series (i.e. Douglas-fir, Douglas-fir/tanoak and tanoak) are found on approximately half of the project area and a little over half of the Oregon portion of the watershed (Table 8). These are highly productive sites supporting a relatively high amount of aboveground biomass. The forested/serpentine series (Jeffrey pine and white oak) are found on 12 to 18% of the watershed and project area. The harsh growing conditions found on serpentine areas limit the amount of aboveground biomass, facilitating an open savannah condition. The forested / non-serpentine and forested / serpentine series are juxtaposed on the landscape with ecotonal areas present as the soils transition. Serpentine areas, development/private land, private

harvest and the Longwood fire have separated many of the forested (non-serpentine) areas from other upland forests.

The Jeffrey pine and white oak community is a steady state community that resembles early and mid-seral stand structures if fire is allowed to play a role. In this community recruitment of new trees is continuous, canopy closure is low and large trees are rare. Fire exclusion in this community is currently causing shrub decadence, reduction of native grass and forb abundance and diversity (caused by invasive non-native annuals), and low tree vigor from increased tree/shrub densities.

The riparian and non-forest/developed series include the riparian/hardwood, water, non-forest, developed/non-vegetated and developed/vegetated series (Table 8). There is no information on plant series in the California portion of the watershed.

**Table 8. Plant Series**

| Plant Series | BLM | Percent BLM | Non-BLM | Percent Non-BLM | Total | Percent Total |
|---|---|---|---|---|---|---|
| Non-forest | 470 | 9 | 1,080 | 7 | 1,550 | **8** |
| Water | 52 | 1 | 249 | 2 | 301 | **1** |
| Developed/Non-Vegetated | | 0 | 319 | 2 | 319 | **2** |
| Developed/Vegetated | 16 | 0 | 3,776 | 25 | 3,792 | **19** |
| Riparian/Hardwoods | 148 | 3 | 1,119 | 7 | 1,267 | **6** |
| Jeffrey Pine | 1,336 | 27 | 1,042 | 7 | 2,378 | **12** |
| Tanoak/Douglas-fir | 418 | 8 | 1,665 | 11 | 2,083 | **10** |
| Douglas-fir | 2,179 | 43 | 5,957 | 39 | 8,136 | **40** |
| Douglas-fir/Tanoak | 361 | 7 | 16 | 0 | 377 | **2** |
| White Oak | 47 | 1 | 23 | 0 | 70 | **0** |
| ***Watershed Total** | ***5,027*** | | ***15,246*** | | ***20,273*** | |
| Non-forest | 65 | 3 | 134 | 4 | 199 | **4** |
| Water | 19 | 1 | 36 | 1 | 55 | **1** |
| Developed/Non-Vegetated | 0 | 0 | 20 | 1 | 20 | **0** |
| Developed/Vegetated | 11 | 1 | 888 | 25 | 899 | **16** |
| Riparian/Hardwoods | 93 | 5 | 496 | 14 | 589 | **11** |
| Jeffery Pine | 629 | 33 | 381 | 11 | 1,010 | **18** |
| Tanoak/Douglas-fir | 420 | 22 | 1,214 | 34 | 1,634 | **30** |
| Douglas-fir | 311 | 16 | 370 | 10 | 681 | **12** |
| Douglas-fir/Tanoak | 361 | 19 | 15 | 0 | 376 | **7** |
| ***Project Area Total*** | ***1,909*** | | ***3,554*** | | ***5,463*** | |

*No data available for Forest Service and private lands in California

## Disturbance History

Natural and human caused fire played an important role in vegetative community structure and composition prior to the adoption of effective fire suppression techniques.

On Jeffery pine and white oak areas within the project area, the fire regime has been characterized as high frequency (0-35 years), low severity. On these sites, frequent surface fires maintained an open pine/oak savannah condition with low stand densities. Frequent fire also created un-even aged stands with multiple canopy layers. On Douglas-fir and tanoak forests the fire regime has been characterized as moderately frequent (35-100+ years), mixed severity. On these sites fire was more variable, creating a diversity of stand ages, size classes and densities (Agee 1993).

Since the 1850s there have been two major fire events in the watershed, a human caused fire in 1868 and the lightning caused Longwood fire of 1987. "The fire of 1868 was one of the largest…in Oregon of which there is any record. The distance it burned inland varied up to thirty miles. The Rogue River drainage probably was one of the hot spots of the burn" (Cooper 1937). "It is believed that the fire started near Scottsburg from a settler's clearing fire… burned an estimated 300,000 acres of forests, some estimated to have been about 300 years old" (Morris 1934). This particular event has shaped the landscape significantly; leaving only five to fifteen remnant trees per acre and a dense cohort (age group) of conifers that are now approaching 130 years of age. This new generation differs in form and structure from the remnant trees due to the lack of frequent fire, which helped form open grown, structurally complex old-growth characteristics (Poage and Tappeiner 2002). Crown recession on the 130 year-old trees makes the creation of large gnarled lower limbs unlikely because of the low light environment of dense stands.

The Longwood fire was one of several lightning fires that burned approximately 8,000 acres in the EF Illinois River watershed in 1987. Approximately 40% of the area in the Longwood fire burned at high intensity (i.e. stand replacement). Only a small portion of the project area experienced low intensity fire in this event, with stand replacement fire evident on adjacent Forest Service and private land.

Other natural disturbances include insects, floods and wind. These disturbances create landscape variability in natural systems ranging from single tree mortality, to small gap mortality, to larger stand replacement disturbance events. Examples of these types of disturbances that are currently seen on the landscape are the flood of 1997 and pockets of mortality from bark beetles. Bark beetles, the primary insect agent in Southwest Oregon, typically feed on weakened and stressed trees that are large enough in diameter to produce adequate nutrients for insects to consume. The relation of growth to sapwood produces a vigor index for individual trees which can be used to predict the likelihood of attack by bark beetles. As sunlight becomes a limiting factor due to increase tree competition, vigor typically declines. Vigor index was calculated on core samples taken from 24 Douglas-fir site trees within the project area. All of these trees had a vigor index below 80 which is considered the threshold for insect attack (Mitchell et al. 1983). Insect activity from 2001-2004 was mapped on approximately 3% of the project area during the annual aerial insect inventory. In non-drought cycles, such as the current cycle, this level of mortality represents endemic (low population) levels (as opposed to epidemic levels).

The impacts of timber harvesting have varied both spatially and temporally across ownerships. In managed stands, which have been clear-cut and replanted, the vegetative community lacks vertical and horizontal structure. Resprouting of hardwoods within these stands has occurred, creating species diversity with a hardwood component. Pre-commercial thinning in the last 5-10 years retained a mix of species to promote long-term stand development into a vertically diverse structure. Individual tree selection harvest (selective cutting, commercial thinning, density management and mortality salvage) have had less impact on the vertical and horizontal structure.

Another prevalent human disturbance within the project area was mining that began in the 1850s, peaked in the late 1800s and ended in the 1940s. With this mining came settlement of two major town centers, Allentown and Waldo, with populations up to 500 for the two sites. Vegetation in close proximity to the Allentown site (Allen Gulch) has been aged at 50-60 years indicating that ecological recovery of the site is fairly recent. This vegetation is highly variable in structure, composition, and health. Pine, oak and cedar are generally more vigorous than other species but pockets of even these species are experiencing stress. Stress on the site is likely linked to limited

soil nutrient and water availability, and soil structural characteristics (compaction, high rock content, etc.).

**Vegetation Condition Class/Stand Dynamics**

Vegetation condition classes (VCC) can be used to determine the relative distribution of seral/structural stage across the watershed. On BLM land the mid and mature classes dominate (75%) with the remaining area in the non-vegetated, grass/forb, shrub, hardwood, seedling/sapling and pole classes (Table 9). These vegetation condition classes are also found on non-BLM lands with the major difference in the amount of developed vegetated and non-vegetated classes (0% on BLM versus approximately 53% on private) and the mature class (49% on BLM versus 2% on private).

Non-vegetated areas include water and rock landscape features, while the grass/forb, shrub and hardwood vegetation classes represent non-forest or woodland classifications. Across BLM and private ownerships these non-forest and woodland classes represent 12% (2,403 acres) of the Oregon portion of the watershed (Table 9).

The seedling/sapling and early condition classes most often represent plantation stands. In the project area, there are 48 acres of the early condition class on BLM (approximately 2% of the project area) (Table 9). In the Oregon portion of the East Fork watershed, across all ownerships, there are 327 acres (2% of the watershed) of seedling/sapling and early condition classes. Forest Service data estimates that 9,519 acres (17 % of the watershed) are listed as seedling/sapling/pole size classes (<9" dbh). The lack of data layers and the crosswalk between BLM and Forest Service vegetation classes makes interpretation of exact watershed percentages difficult. The analysis indicates that early seral vegetation is more prevalent on Forest Service land in Oregon and California.

| Table 9. Vegetation Condition Class | | | | | | |
|---|---|---|---|---|---|---|
| **Vegetation Condition Class (VCC)** | **BLM** | **Percent BLM** | **Non-BLM** | **Percent Non-BLM** | **Total Acres** | **Percent** |
| Developed/ non-vegetated | 0 | 0 | 172 | 1 | 172 | **1** |
| Developed/vegetated | 1 | 0 | 7,535 | 52 | 7,536 | **38** |
| Non-vegetated | 95 | 2 | 627 | 4 | 722 | **4** |
| Grass/forbs | 456 | 9 | 606 | 4 | 1,062 | **5** |
| Shrub | 113 | 2 | 253 | 2 | 365 | **2** |
| Hardwood | 31 | 1 | 224 | 2 | 255 | **1** |
| Seedling/sapling | 275 | 5 | 0 | 0 | 323 | **2** |
| Early (0-5" dbh) | 52 | 1 | 0 | 0 | 4 | **0** |
| Poles (5-11" dbh) | 213 | 4 | 184 | 1 | 397 | **2** |
| Mid (11-21" dbh) | 1,333 | 26 | 4,726 | 32 | 6,059 | **31** |
| Mature (>21" dbh) | 2,475 | 49 | 312 | 2 | 2,787 | **14** |
| ***Watershed Total** | ***5,044*** | | ***14,639*** | | ***19,683*** | |
| Developed/ non-vegetated | 0 | 0 | 0 | 0 | 0 | **0** |
| Developed/vegetated | 0 | 0 | 1,664 | 47 | 1,664 | **31** |
| Non-vegetated | 68 | 4 | 182 | 5 | 250 | **5** |
| Grass/forb | 103 | 5 | 115 | 3 | 217 | **4** |
| Shrub | 9 | 0 | 0 | 0 | 9 | **>1** |
| Hardwood | 12 | 1 | 179 | 5 | 192 | **4** |
| Seedling/Sapling | 0 | 0 | 0 | 0 | 0 | **1** |
| Early (0-5" dbh) | 48 | 2 | 0 | 0 | 48 | **0** |
| Poles (5-11" dbh) | 107 | 6 | 0 | 0 | 107 | **2** |
| Mid (11-21" dbh) | 642 | 34 | 1,117 | 31 | 1,758 | **32** |
| Mature (>21" dbh) | 920 | 48 | 298 | 8 | 1,218 | **22** |
| ***Project Area Total** | ***1,909*** | | ***3,555*** | | ***5,464*** | |
| *No data available for Forest Service and private lands in California | | | | | | |

It is important to note the presence of one 75 acre area (T40S-R8W-34-010A) that qualifies as old-growth as defined by the Medford District RMP (pp. 109, 113) (~180+ year old stand, multilayered, multispecies canopy, high incidence of large trees, broken tops and indications of decadence such as snags and large downed wood). The area contains large tanoaks and a scattered overstory of remnant Douglas-fir that are predominately older than 200 years. This unique area appears to have survived the large fire in 1868 that burned most of the forested areas in the watershed. Fires scars on the remnant trees indicate that while the fire did burn in this area, it did not result in stand replacement.

**Stand Inventory/Density**

Stand exams were conducted on 12 representative stands in the project area. Table 10 illustrates the variability in species composition with some stands containing more hardwood trees per acre than conifers while in others, conifers dominate. Hardwoods make up 46% of the trees/acre in survey areas, but most of these are found in the understory (small diameter). Total trees per acre range from 236 to 661 in these stands. Basal areas ranged from 128 to 296 $ft^2$/acre with the least being found in the small diameter pole stands. Relative densities range from 52% to more than 104%. Mortality typically begins at a relative density of 55% or more in the smallest suppressed size classes. Although stands can remain slightly above 100% relative density, they are more susceptible to mortality caused by suppression, disease, insects or drought. Average diameters are low in these stands (6.9-11.9" dbh) because of the high number of trees per acre in the smaller size classes. In order to characterize stand composition in terms of fuel arrangement, six

of these stands were entered into Fuels Management Analyst (FMA), a fire behavior model. (See fuels discussion for greater detail.)

**Table 10. Inventory Summary from ORGANON* for the Project Area**

| Unit (Twnship, range, section, OI#) | Trees Per Acre | | | | Basal Area ($ft^2$/acre) | Relative Density (%) | Average Diameter (inches) |
|---|---|---|---|---|---|---|---|
| | Douglas-fir | Pine | Other Conifer | Hardwood | | | |
| 40S-8W-24-002A | 277 | 16 | 28 | 86 | 249 | 84 | 10.6 |
| 40S-8W-33-001 | 236 | 51 | 20 | 182 | 194 | 72 | 8.5 |
| 40S-8W-33-006 | 267 | 20 | 65 | 129 | 272 | 94 | 10.2 |
| 40S-8W-34-002 | 181 | 13 | 1 | 364 | 262 | 93 | 9.3 |
| 40S-8W-34-010A | 287 | 15 | 4 | 191 | 228 | 85 | 8.4 |
| 40S-8W-35-001 | 199 | 6 | 7 | 200 | 271 | 90 | 11.0 |
| 41S-8W-10-003 | 164 | 6 | 1 | 111 | 218 | 70 | 11.9 |
| 41S-8W-23-012 | 336 | 10 | 37 | 278 | 208 | 80 | 7.6 |
| 40S-8W-24-007 | 253 | 12 | 8 | 244 | 184 | 69 | 8.1 |
| 40S-8W-33-007A | 109 | 4 | 49 | 327 | 128 | 52 | 6.9 |
| 40S-8W-34-003 | 230 | 26 | 4 | 339 | 296 | 104 | 9.5 |
| 40S-8W-23-017 | 106 | 3 | 0 | 127 | 170 | 56 | 11.5 |
| **Average** | **48%** | **3%** | **4%** | **45%** | **209** | **74** | **8.5** |

*Hann et al. 1997

In the project area, fire exclusion has created conditions favorable to Douglas-fir/tanoak establishment, resulting in abnormally high stocking densities. Once established, these overly dense stands develop into the stem exclusion phase: understory vegetation is shaded out, crowns recede, height growth is enhanced, and suppression-induced mortality begins in the smaller tree classes. Crown recession is especially important because once the lower limbs die there is no opportunity to develop large diameter lower limbs which provide important habitat characteristics for some wildlife species. Stands at high densities reach the stem exclusion phase faster than low density stands. Stands remain in the stem exclusion phase until mortality to the overstory creates canopy openings and structural complexity begins to develop (understory reinitiation phase).

Canopy base height and canopy bulk density are the two vegetation parameters that influence fire behavior. Canopy base height refers to the distance from the ground to the lowest live limb; canopy bulk density refers to the amount of biomass within the canopy. Canopy base height ranged from 1-10' in unentered/unmanaged stands with a canopy base height of 27' in 40S-8W-23-017 which was thinned in 1997 under the NorEast project. Canopy bulk densities ranged from 0.0018 to 0.0084 lbs/$ft^2$ per acre; the critical threshold for crown fire potential is 0.0023 lbs/$ft^2$ per acre. These numbers show that ladder fuels and high stand densities exist across the project area except in section 23-017.

### 3.2.2 Environmental Consequences

#### Alternative 1 - No Action

Lack of disturbance in fire-adapted systems, such as those found in the project area, has resulted in higher stocking densities than the site is capable of maintaining. With no action, stands will continue to have low individual tree vigor, reduced understory vegetation, and increased fuel loadings from suppression-induced mortality and litter fall. Higher levels of insect and disease infestation / infection are expected. These conditions are considered outside the range of natural variability for the Douglas-fir and tanoak plant series. Once outside the range of natural

variability, ecosystem stability, biological diversity, resilience and ecosystem health is reduced (Atzet and Martin 1991). The no action alternative allows stands to remain outside the natural range of variability.

The abundance of shade intolerant species such as pine and black oak would continue to decline due to lack of regeneration and large tree mortality. Regeneration of these ecosystem components would continue to be limited by lack of canopy gaps (light to the forest floor) and high duff/litter layers. The longevity of large pre-fire exclusion pines and black oaks would be shortened by competition from post-fire exclusion vegetation. Thus, stand diversity in terms of species abundance and vertical structure would continue to be reduced.

Stand level complexity will eventually be attained through insect and disease attack, windthrow, and tree decadence but only if major stand replacement events do not occur. Tree structure would be compromised by the lack of large diameter lower limbs.

The major impact of no action to the Jeffrey pine/white oak community is continued shrub decadence, reduction of native grass and forb abundance/diversity, and reduction of overstory tree vigor from higher stocking levels.

**Cumulative Effects**

Annual insect surveys of Southwest Oregon indicate an increase in insect activity corresponding to the drought of 2001. In the advent of another, more prolonged drought period, low vigor trees in the project area will likely succumb to beetle attack. (Sartwell and Stevens 1975, Cole and Cahill 1976, Mitchell et al. 1983, Amman and Logan 1998, Kolb et al. 1998, McDowell et al. 2003). If insect populations are allowed to build-up on BLM lands within the project area, the potential for these to spread to adjacent land increases. At endemic levels of infestation, trees of low vigor are typically attacked, but once epidemic population levels are reached even healthy trees are subject to attack.

The high fuel loadings and ladder fuels created by the exclusion of fire and past management has created prime conditions for a wildfire start on BLM to spread to adjacent private/public lands. Stand replacement fire within the watershed will reduce structural complexity, create early-seral conditions, and increase brush abundance.

Wood demand and the need for products to supply this demand are not influenced by the quantity or quality of products taken from public lands. Consumers are responsible for this demand and if wood demand is not met through sustainable forest practices, it will be met in areas not subject to these sustainable practices. Mitigation measures taken on public lands far exceed those taken on other lands; therefore, negative cumulative effects from deferral of harvest on public land are increased by meeting this demand on other lands (Bowyer 1992).

**Alternative 2**

<u>Short Term/Stand Level Effects</u>

Young stand prescriptions would release residual conifers and hardwoods, retaining the most vigorous trees. Brushing and pre-commercial thinning would reduce canopy bulk density and ladder fuels (brush). Surface fuels may increase in units where slash is untreated. Slash following treatment in the young stand in the Community at Risk (CAR) would be handpiled and burned, leaving the stand in a more fire resistant condition. Treated young stands outside the CAR would be evaluated for fire risk and hazard. If slash treatment were unnecessary due to the

low amount of material (woody biomass), treatments surrounding this stand would function to mitigate fire spread from the young stands to other areas.

Treatment of natural fuels in the pole and mid size classes would expedite development into the next vegetation condition class. Thinning from below would raise canopy base height and reduce canopy bulk density making the stands more resistant to stand replacement fire. Underburning would reduce litter depths and down dead material, which would reduce flame lengths in the event of a fire start. Some crown scorch and mortality (less than 15%) is expected to occur from underburning. Previous prescribed burn mortality has been evaluated in other areas and typically results in mortality to less than 15% of the trees per acre (generally in the smallest diameter classes).

In the Jeffrey pine and white oak series, proposed treatments under wildlife habitat restoration and enhancement include prescribed burning as well as hand cutting of excess brush and small diameter trees. Tree vigor will be improved, mortality from insects and disease will be reduced and higher growth rates will raise the average stand diameter more quickly than for no action. Prescribed burning is expected to reduce shrub dominance and allow forb and grass cover to increase. Plant diversity and vigor will be higher within 5 years of treatment than under the no action alternative.

The commercial thinning (CT) prescription includes crown thinning single layered stands to a relative density of 30-40%. The residual stand would be evenly spaced with 40-50% canopy cover. The release of residual trees would increase tree vigor, accelerate diameter growth, retard crown recession and retain high crown ratios over time. These stands currently have relatively little understory vegetation due to high crown closures. Commercial thinning would produce a slight release in understory vegetation.

In areas proposed for density management/modified group selection (DM/Mod GS) removal of trees would occur primarily from the smaller size classes, retaining a canopy cover of 40% and creating an occasional canopy gap around large pines and hardwoods. The resulting stand structure would be vertically and horizontal diverse. The target canopy closure in these stands would result in a fairly open structure with light reaching the forest floor. Pine and oak regeneration is expected to increase and understory plant diversity/abundance will be greater. Release of residual trees would accelerate diameter growth, retain high crown ratios and increase individual tree vigor.

A growth and yield model (Hann et al. 1997) was used to simulate stand conditions after implementation of density management. Post treatment relative densities ranged from 28-42% on the 12 representative stands (Table 11). The stand with the lowest relative density (40S-8W-33-007A) is a pole-sized stand, which would primarily be a non-commercial treatment under the fuel hazard reduction proposal. Residual basal areas ranged from 117-156 $ft^2$/acre, which, when averaged across the 12 stands, represents a removal of approximately 43% of the basal area, primarily in the small diameter class as evident by the increase in average stand diameter. The post harvest stand structure also shows a more balanced distribution of Douglas-fir, pine and hardwoods, supporting the attainment of a mixed species stand than currently exists (Table 11).

| Table 11. ORGANON Post-treatment Summary* | | | | | | | |
|---|---|---|---|---|---|---|---|
| Unit (Township, range,section, OI#) | Trees Per Acre | | | | Basal Area ($ft^2$/acre) | Relative Density | Average Diameter |
| | Douglas-fir | Pine | Other Conifer | Hardwood | | | |
| 40S-8W-24-002a | 277 | 16 | 28 | 86 | 249 | 84 | 10.6 |
| After Harvest → | 19 | 14 | 25 | 51 | 148 | 40 | 19.2 |
| 40S-8W-33-001 | 236 | 51 | 20 | 182 | 194 | 72 | 8.5 |
| After Harvest → | 24 | 46 | 18 | 56 | 127 | 37 | 15.6 |
| 40S-8W-33-006 | 267 | 20 | 65 | 129 | 272 | 94 | 10.2 |
| After Harvest → | 30 | 18 | 58 | 49 | 156 | 43 | 18.2 |
| 40S-8W-34-002 | 181 | 13 | 1 | 364 | 262 | 93 | 9.3 |
| After Harvest → | 20 | 12 | 1 | 49 | 145 | 39 | 18.7 |
| 40S-8W-34-010a | 287 | 15 | 4 | 191 | 228 | 85 | 8.4 |
| After Harvest → | 16 | 14 | 4 | 56 | 156 | 42 | 19.5 |
| 40S-8W-34-001 | 199 | 6 | 7 | 200 | 271 | 90 | 11.0 |
| After Harvest → | 25 | 6 | 7 | 40 | 152 | 40 | 20.3 |
| 41S-8W-10-003 | 164 | 6 | 1 | 111 | 218 | 70 | 11.9 |
| After Harvest → | 22 | 6 | 1 | 22 | 120 | 30 | 21.9 |
| 41S-8W-23-012 | 336 | 10 | 37 | 278 | 208 | 80 | 7.6 |
| After Harvest → | 30 | 9 | 33 | 63 | 115 | 34 | 14.8 |
| 40S-8W-24-007 | 253 | 12 | 8 | 244 | 184 | 69 | 8.1 |
| After Harvest → | 25 | 11 | 7 | 108 | 120 | 38 | 12.6 |
| 40S-8W-33-007a | 109 | 4 | 49 | 327 | 128 | 52 | 6.9 |
| After Harvest → | 63 | 4 | 44 | 67 | 78 | 28 | 9.1 |
| 40S-8W-34-003 | 230 | 26 | 4 | 339 | 296 | 104 | 9.5 |
| After Harvest → | 23 | 23 | 4 | 35 | 134 | 36 | 19.3 |
| 40S-8W-23-017 | 106 | 3 | 0 | 127 | 170 | 56 | 11.5 |
| After Harvest → | 16 | 3 | 0 | 127 | 117 | 38 | 12.2 |
| **Pre Harvest Avg.** | **48%** | **3%** | **4%** | **45%** | **209** | **74** | **8.5** |
| **Post Harvest Avg.** | **24%** | **13%** | **12%** | **51%** | **121** | **34** | **15.8** |
| *Shaded areas represent the post-harvest stand attributes as estimated by ORGANON | | | | | | | |

In all harvest units, activity fuels would be piled and burned. Understory trees would be slashed to spacing specifications, leaving the most vigorous conifers and hardwoods, and slash would be piled and burned. In most units, a follow-up underburn would occur after pile burning. Mortality and crown scorch are expected to be within the levels discussed in the fuels reduction section. The short-term effects of these activities are reduced surface and ladder fuels, mortality to understory vegetation in a mosaic pattern, and exposure of bare mineral soil, also in a mosaic pattern. Tiedemann (2000) found potential short-term effects including growth decline of overstory trees; however, tree cores from overstory trees in the nearby McMullin project area show no growth decline after prescribed fire. Within 2-5 years of these treatments, understory vegetation would resprout with higher species diversity expected. Providing canopy separation by removing some of the larger overstory trees would reduce the likelihood of large stand replacement fire events.

In areas proposed for restoration thinning, treatment effects will vary depending on site characteristics. The level of removal will be guided by species, individual tree vigor and site indicators of soil moisture / nutrients. Trees showing signs of stress, in direct competition with vigorous pine, oak and cedars, or determined to be in excess of density targets would be removed. Since density targets are highly variable (60 $ft^2$/acre for dry sites and 100 $ft^2$/acre for wetter sites) the resulting structure and species mix will be highly variable. In order to maintain this structure, prescribed fires every 7 to 15 years, which mimic the natural fire return interval

would be the only vegetation manipulation tool used in the future. The effects of prescribed fire are similar to those disclosed for the harvest prescriptions.

Long-term/Landscape Level Effects

Alternative 2 would perpetuate a diversity of structures, species, and landscape habitat components (snags, down-wood, large hardwoods and conifers). Since this alternative proposes the highest level of treatment, the landscape would be in a fairly open condition initially. This would benefit early successional species such as pines and oaks, which are currently in decline. As growth and regeneration advance, the effects of treatments would be less apparent. As evidenced by the plant community response to the large fire of 1868, a third age group would emerge, creating another layer of vegetation.

Effects to Productivity

Alternative 2 would retain a mix of hardwoods, grasses, forbs, shrubs and conifers on the landscape, providing future organics and soil nutrients. Fuel treatment would reduce duff layers in a mosaic pattern. Retaining a mix of species across the landscape and residual duff or organic layers provides for current and future productivity. Since the key components of ecosystem productivity are retained, there are no expected decreases in productivity.

Additionally, long-term studies have reported no decline in site productivity with substantive soil compaction and removal of surface organic matter (Powers et al. 2004). Another study found that land-use conversion from forest to residential or agricultural development has the greatest impact on forest productivity and habitat (Rochelle, 1998; Perry et al. 1989). Given that Alternative 2 results in minimal soil compaction and organic matter removal and does not propose land-use conversion, long-term effects on site productivity are not expected.

Cumulative Effects

Forest development, wildlife habitat restoration/enhancement, and fuel hazard reduction treatments are proposed on 869 acres (1.5% of the watershed) under this alternative. These treatments will provide for future stand development, restore key ecosystem structures and processes and in combination with the commercial treatments proposed, reduce the likelihood for a fire start on BLM land to spread to adjacent lands. These thinning activities will increase individual tree vigor, reducing the potential for epidemic beetle populations to build up and spread to adjacent lands.

Commercial harvest has occurred on approximately 2,278 acres of the BLM lands in the East Fork watershed since 1956 (USDA, USDI 2000). In general this was selective harvest rather than regeneration harvest. On Forest Service lands, approximately 7,238 acres since the 1940s have been regeneration harvested. When taken cumulatively, harvest on public land has occurred on less than 16% of the East Fork watershed in the last 50 years.

The proposed action includes 938 acres of various levels of commercial harvest, representing 1.6% of the East Fork watershed. There are no other planned commercial entries on BLM lands, but on Forest Service lands a small diameter plantation thinning project is currently being planned on approximately 1,150 acres (2% of the watershed) over the next ten years. Josephine County has 80 acres of partial cutting planned in the East Fork watershed. Private forest industrial ownership is limited (~300 acres) in the Oregon portion of the watershed, therefore cumulative effects from even-age industrial forest practices is minimal.

Through recovery of past harvest units and management activities emphasizing thinning to increase growth rates, there is and would continue to be an increase in mature stand structure at both the watershed scale and project level. Additionally, minimizing the risk of epidemic insect infestations and reducing surface, ladder and canopy fuels would minimize cumulative effects of insects and fire. These effects would be beneficial to forest stands, rather than detrimental.

**Alternative 3**

The retention of the entire overstory canopy under this alternative would not provide for individual tree release sufficient to increase tree vigor. Crown recession would continue and the opportunity to develop structurally diverse older trees would be lost. Furthermore, large oaks and pines would continue to decline in abundance. The lack of sunlight to the forest floor would limit understory species diversity or abundance, regeneration of conifers would be inconsequential, and tanoak understory abundance and biomass would increase. The effects would be similar to those described in alternatives 2 and 4 for young stands, fuel hazard reduction and wildlife habitat restoration and enhancement areas.

Cumulative Effects
The level of tree removal for this alternative in mid and mature Douglas-fir/tanoak forests would be inconsequential which allows current stand trajectories to progress. The cumulative impacts to these areas would be the same as those described for the no-action alternative.

**Alternative 4**

The proposed action for young stands is the same as alternative 2; therefore the effects are similar. The effects for areas treated under fuel hazard reduction and wildlife habitat restoration and enhancement will be the same as those described in alternative 2 except in the no-treatment areas outside the CAR. These areas will have the same effects as described in the no-action alternative. The prescription for restoration thinning is the same as alternative 2; therefore the effects to this community will be the same.

Stands with a density management (DM) prescription would include removal of trees primarily from the smaller size classes, retaining canopy closures of at least 60% and creating a relatively evenly spaced residual stand because no gaps are proposed. The opportunity to release large pines and oaks would be missed by retaining higher canopy closures, and regeneration of these species would be minimal. Individual tree release will be accomplished but the window of release would be shorter as crowns expand. Understory thinning followed by underburning would reduce ladder and surface fuels. The thinning and follow up burning would effectively reduce the likelihood of stand replacement fire.

Underburning would create patches of bare mineral soil for regeneration of trees dependent upon bare mineral soil for germination. Overstory shade to these species would impact growth rates progressively as overstory crowns expand and seedling/saplings increase in size. As the sunlight becomes more limiting, crown vigor on the new trees would decline. Because of the high canopy retention levels, this layer is not expected to be as vigorous or as large as in alternative 2. Native grasses and forbs would respond as well, enhancing understory diversity but to a lesser extent than is expected with the lower canopy retention levels in alternative 2. Retaining higher canopy closures will also impact large hardwoods resulting in mortality to some of these important structural components.

In patches of dense large trees, individual tree vigor would remain low, pine and oak regeneration would be limited, and opportunity to provide commodities or services would be minimal. In no treatment stands, fire hazard would remain high, individual tree vigor would continue to decline and structural development would be delayed.

Cumulative Effects

Since the proposed treatment acres and harvest amount is less than alternative 2, the cumulative impacts are less than those described under alternative 2. Maintaining higher canopy closures would reduce the beneficial effects of retaining pines and oaks and increasing individual tree vigor. The opportunity to promote regeneration of pines and oaks is also lost by retaining higher canopy closures.

## 3.3 Botanical Resources

### 3.3.1 Affected Environment

The project area was surveyed for federally listed plant species, Bureau Special Status plant species, and noxious weeds during the 1995-2005 field seasons. Surveys documented 73 occurrences for 18 species of listed plants in the project area (Table 12). More than 10 occurrences for 3 species of noxious weeds were documented (Table 13). The project area is in the range of the federally listed species *Fritillaria gentneri* and *Lomatium cookii*; however, *F. gentneri* was not found in the project area. Surveys were also conducted for Survey and Manage (S&M) category A and C species. S&M fungi species with ranges in the Medford District BLM are in categories B, D, E, or F, for which pre-disturbance surveys are not required (USDI, USDA 2001, Standards and Guidelines, pp. 7-14). Pre-disturbance surveys for fungi are not practical because they fruit irregularly or for a short duration, or are cryptic in nature. S&M fungi with a category listing of A, B, and E are listed as "manage known sites". Categories C and D are listed as "manage high priority sites". Species listed as categories A, B, D, E, and F were not found in the project area. Only category C species have been found as indicated in the table below.

Fungi

No pre-project surveys were conducted for fungi because no fungi are in categories for which pre-disturbance surveys are required. There are three previously known sites of S&M or BS fungi in the project area. All of these sites are located outside of projects units and would not be impacted by any proposed actions If additional S&M or BS fungi sites are discovered on BLM-administered land before project implementation, these sites would be protected according to *Management Recommendations for Survey and Manage Fungi* (Castellano and O'Dell 1997).

Only S&M Category B, D, and F, BS, and BT fungi are included on the Medford BLM Special Status Plant list. These are species expected to be found within the District. Management policy for Category B fungi gives direction to "manage all known sites and reduce the inadvertent loss of undiscovered sites" (USDA and USDI 2001, S&G-9). Reducing the inadvertent loss of undiscovered Category B fungi sites is accomplished through Strategic Surveys, which are currently being conducted at a regional level. Management directions for Category D fungi are to manage known sites to provide for a reasonable assurance of species persistence (USDA and USDI 2001, S&G-11). Managing known sites is not required for Category F fungi because they are uncommon, not rare (USDA and USDI 2001, S&G- 13). The inadvertent loss of Category D and F fungi are not considered likely to change the level of rarity of these species (USDA and USDI 2001, S&G-9-14).

Pre-disturbance surveys are not required for S&M, BS, or BT fungi. Above-ground fruiting structures (sporocarps) are short-lived, seasonal, and annually variable making surveys difficult (USDA, USDI 2004). According to BLM Information Bulletin #OR-2004-145, it is expected that field units will not conduct field surveys for these species due to survey impracticality.

Bureau Tracking species are not considered Special Status species for management purposes and no further analysis is required. The effects of management actions on S&M fungi were analyzed under the *FSEIS For Amendment to the Survey & Manage, and other Mitigation Measures, Standards and Guidelines* (USDA and USDI 2001) and strategic surveys are being conducted that satisfy the requirements of avoiding the inadvertent loss of undiscovered Category B fungi. No further analysis of the effects on S&M , BS, or BT fungi of the projects proposed under this EA will be discussed as the proposed actions would not impact these species.

**Table 12. Botanical Survey Findings**

| VASCULAR PLANTS | | | | |
|---|---|---|---|---|
| **Species** | **Habitat** | **Protection Status** | **Populations in Project Area** | **Populations on the District** |
| *Lomatium cookii* (Cook's lomatium) | Vernal pool/patterned ground areas on mounds and moist sites in meadows. | Federally Endangered | 1 | 29 |
| *Calochortus howellii* (Howell's mariposa lily) | Dry, open slopes. Rocky, serpentine, in Jeffrey pine forests. | State Threatened | 5 | 122 |
| *Microseris howellii* (Howell's microseris) | Dry, rocky areas on serpentine soil. | State Threatened | 1 | 204 |
| *Cypripedium fasciculatum (*Clustered ladyslipper) | Moist microsites in mixed evergreen forests. | S&M Category C and Bureau Sensitive | 2 | 1,242 |
| *Cypripedium montanum* (Mountain ladyslipper*)* | Moist microsites in mixed evergreen forests. | S&M Category C and Bureau Tracking | 1 | 567 |
| *Erythronium howellii (*Howell's fawn lily) | Usually in or near serpentine in ecotones. Found in tree/shrub shade on forest edge. | Bureau Sensitive | 37 | 159 |
| *Limnanthes gracilis* var. *gracilis* (Slender meadow foam) | Wet ground, on serpentine soils. | Bureau Sensitive | 7 | 89 |
| *Cryptantha milobakeri* (Milo baker's cryptantha) | Rocky/gravelly slopes, generally coniferous forests. | Bureau Assessment | 1 | 24 |
| *Delphinium nudicaule* (Red larkspur) | Open areas on rocky slopes, among shrubs and woods. | Bureau Assessment | 1 | 19 |
| *Fritillaria glauca* (Siskiyou fritillary) | Dry rocky slopes, often serpentine. | Bureau Assessment | 4 | 85 |
| *Solanum parishii* (Parish's nightshade) | Open dry grassy and brushy slopes. | Bureau Assessment | 1 | 69 |
| *Cardamine nuttallii* var. *gemmata* (Yellow tubered toothwort) | Gravelly serpentine ridges, jeffrey pine areas, riparian slopes, and near *Darlingtonia* bogs. | Bureau Tracking | 1 | 17 |
| *Lewisia oppositifolia* | Open moist serpentine rock or soil. | Bureau Tracking | 2 | 19 |
| *Montia howellii* (Howell's minerslettuce) | Open vernally wet sites, often on compacted soils. | Bureau Tracking | 1 | 7 |

| Table 12. Botanical Survey Findings | | | | |
|---|---|---|---|---|
| **VASCULAR PLANTS** | | | | |
| **Species** | **Habitat** | **Protection Status** | **Populations in Project Area** | **Populations on the District** |
| *Sedum laxum* ssp. *heckneri* (Heckner's stonecrop) | Dry rocky places on serpentine. | Bureau Tracking | 3 | 11 |
| *Streptanthus glandulosus* (Common jewel flower) | Open dry areas, sometimes on serpentine. | Bureau Tracking | 1 | 2 |
| *Thlaspi montanum* var. *siskiyouense* (Siskiyou mountain pennycress) | Moist rocky serpentine soil. | Bureau Tracking | 2 | 9 |
| **NON-VASCULAR PLANTS** | | | | |
| *Pseudoleskeella serpentinensis* (Moss) | Serpentine rocks. | Bureau Assessment | 2 | 44 |
| | | | | |

| Table 13. Noxious Weed Survey Findings | | | |
|---|---|---|---|
| **SPECIES** | **COMMON NAME** | **DESIGNATION** | **SECTION** |
| *Centaurea debeauxii* | Meadow Knapweed | B | **38S-07W**-31 |
| *Centaurea triumfettii* | Sqarrose Knapweed | A | **39S-08W**-21 |
| *Rubus discolor* | Himalayan Blackberry | B | **38S-07W**-29,31 |

### 3.3.2 Environmental Consequences

The only botanical species discussed will be those species depicted in the tables above. Survey and Manage (S&M), Threatened and Endangered (T&E), State Threatened (STO), and Bureau Sensitive plants are required to be protected and managed. It is Oregon State Office's policy that the Bureau of Land management would protect, manage, and conserve those sensitive species and their habitats such that any Bureau action would not contribute to the need to list any of these species (IM OR-91-57). Bureau Assessment species are currently not eligible for federal listing, but are of a conservation concern and may need protection or mitigation from BLM activities. Bureau Tracking species are not Special Status species for management purposes, but are documented to help determine future status and management. Protection for these species is discretionary and based on species and treatment prescribed.

**Alternative 1 – No Action**

The no action alternative would not result in direct effects to S&M, STO, T&E or special status species. Effects could be negative or positive indirect effect based on the species and habitat requirements as described below.

Fuels Treatment and Timber Harvest

Without treatment, a build-up of fuels would continue to occur within the plant populations. This build-up would create favorable conditions for higher intensity wildfires, which could result in extensive damage to habitat. Fire has played an extremely important role in influencing the plant communities of southwestern Oregon. The mixed evergreen forests and shrublands typically found in the Illinois Valley and in this project area have been created and perpetuated in

the past by fire. This regime has been disrupted by fire control activities (Franklin and Dyrness 1988).

Certain plant species, such as *Cypripedium fasciculatum,* and *C. montanum,* require a sufficient amount of down logs, snags, duff layer, and canopy cover to maintain soil moisture and mycorrhizal associates. These species, which thrive in canopies with dense conditions would benefit by increased density and canopy cover. Habitat conditions for species requiring canopy openings, such as *Calochortus howellii, Cardamin nuttallii* var. *gemmata, Cryptantha milobakeri, Delphinium nudicaule, Erythronium howellii, Fritillaria glauca, Lewisia oppositifolia, Limnanthes gracilis var. gracilis, Lomatium cookii*, *Microseris howellii, Montia howellii, Sedum laxum* ssp. *heckneri, Solanum parishii, Streptanthus glandulosus,* and *Thlaspi montanum* var. *siskiyouense*, would decline due to shrub/conifer encroachment and crowded conditions.

Road Work and Noxious Weeds

Noxious weeds can out-compete native plants, reduce habitat for native insects and animals, and threaten biological diversity. They can alter soil fertility, dry up water supplies, poison animals, decrease agriculture production, infest rivers, and reduce the recreational value. Noxious weeds find disturbed sites favorable for habitat. Vehicles are a primary method for transporting noxious weeds and creating new populations of noxious weeds. No action would create no additional disturbance or access that may result in new weed populations. However, existing populations would not receive priority for treatment compared to the action alternatives. Therefore, the risk of weed infestation would be higher under no action because weedss would not be treated, even though disturbance is proposed in other alternatives.

**Alternative 2**

Short and Long Term Effects to Known Populations

Due to project design features (PDFs) there should be no direct or indirect effects to existing listed botanical species. For some species that require higher canopy closures, buffers are expanded beyond the actual population in order to protect habitat for future population expansion. Buffers surrounding all listed plant sites would provide protection from project activities. Buffer sizes would be based on species, habitat, and treatment. A 20' minimum buffer would encompass State Threatened and Special Status species. While protection of Bureau Assessment species is discretionary, protection would occur for these species, dependent on habitat needs and activity. Therefore, implementation would not contribute to the listing of vascular plants, non-vascular plants or fungi.

Fuels Treatment and Timber Harvest

Treatments that reduce shrub and canopy cover to 40% may degrade occupied habitat for some botanical species (*Cypripedium fasciculatum* and *C. montanum)* if canopy opening reduces or dries moist microsites. However, this short term degradation would only occur on ~ 600 acres and would begin to recover within two years at which time shrub and canopy cover increases. These treatments would not lead to the listing of any botanical species, given the small scale of treatment(<2% of the Lower East Fork sub-watershed), short duration of effects, protection buffers, and presence of habitat for these species found adjacent to the project area, within the watershed, throughout the district and the Pacific Northwest.

Canopy thinning should improve habitat for those plant species requiring openings by reducing competing vegetation and opening the canopy (*Calochortus howellii, Cardamin nuttallii* var. *gemmata, Cryptantha milobakeri, Delphinium nudicaule, Erythronium howellii, Fritillaria glauca, Lewisia oppositifolia, Limnanthes gracilis var. gracilis, Lomatium cookii*, *Microseris howellii, Montia howellii, Sedum laxum* ssp. *heckneri, Solanum parishii, Streptanthus glandulosus,* and *Thlaspi montanum* var. *siskiyouense*).

Fuels treatments would maintain botanical species habitat while protecting against catastrophic wildfires. Underburning, burning slash and chipped material are treatments that replicate natural, low intensity burns on the landscape. However, a thick layer of slash (>6") creates potential for smoldering under the event of a wildland fire which could damage the soil and seedbed to a point where many species in the herbaceous layer would have difficulty re-establishing. Based on observations in the Ashland Resource Area, this potential for high intensity smoldering and impediment of germination is expected to occur on less than 5% of the project area. This potential woud decrease over time as slash settles and decomposes. PDF requirements for leaving untreated areas, follow up under burns, and avoiding placing material in buffered areas, would minimize slash buildup across the landscape and within plant buffer areas.

Handpiles would be distributed across the landscape covering a maximum of 1,335 acres. Igniting handpiles produces a high intensity burn exposing mineral soil. For the project, an average of 70 handpiles per acre would be burned. Based on 7' x 7' handpile spacing and 70 handpiles per acres, only 7.8% of the area would be covered by the handpiles. At the East Fork Illinois watershed scale, handpiles would occur on 0.3% of the area. Piles burned are not fully consumed, reducing predicted disturbed acreage. Any unknown populations that may be affected would have the opportunity to recover as adjacent population repopulate burned areas. Observation and research from previously treated areas has found that vegetation recovers in a burn pile area within a couple of years.

Some thinning or fuel reduction would occur in the fall, or during plant dormancy periods, which would reduce competition from encroaching species and improve habitat. Also, fuel hazard reduction treatments that thin the understory would help return forests to healthier conditions simulating a more natural fire regime. This, in turn, would reduce the risk of high intensity fire, protecting botanical species.

Biomass Utilization

Approximately 614 acres are identified for potential biomass removal (Map 6), which would reduce hazardous fuels and benefit the local economy. To eliminate effects to botanical species or the spread of noxious weeds, PDFs would be followed. Effects are similar to fuel reduction activities described above. However, there may be an additional 32 acres of soil disturbance due to designated skid trails, which would not be expected to adversely affect botanical species due to PDFs and small scale of the disturbance.

Road Work, Trails, and Noxious Weeds

If left un-checked, noxious weeds would occupy habitat for botanical and native species. Adverse effects to botanical species from the encroachment of noxious weeds could impact populations due to competition for light, water, and nutrients. These effects may reduce populations and potential habitat over time. Road maintenance and temporary construction, tractor harvest, trails and landing construction represent opportunities for seed dispersal of noxious weeds from outside the project area as well as the spread of existing seed present in the project area. However, due to PDFs designed to reduce the risk of weed spread (equipment

washing to remove dirt containing weed seeds or plants, seeding/mulching with native species to help native plants become established more quickly than and thus outcompete noxious weed species, and control or eradication of identified noxious weed sites), the spread of noxious weeds would be greatly minimized and would not be distinguishable above current levels and mechanisms of weed spread (vehicles, wind, animals, etc.). PDFs for reducing or eliminating noxious weed impacts are "widely accepted and utilized as best management practices in noxious weed control across the nation" (Cottonsnake Timber Sale EA Supplement, Glendale Resource Area, Medford BLM 2006).

Known sites would be treated, in accordance to the Medford District Noxious Weed EA, reducing known populations which would not occur under the no action alternative. Given the unpredictability of weed spread through these existing vectors, it is not possible to quantify with any degree of certainty the rate of weed spread in the future or even the degree by which that potential would be affected (increased or decreased) by the proposed action. The potential for the introduction of new infestations is similar for all alternatives. Populations would continue to establish and spread due to seed transport by existing vectors such as vehicles, wildlife, wind, and water.

**Alternative 3 and 4**

Short and Long Term Effects
Species needing denser canopy cover would be maintained and benefit from alternatives 3 and 4 because a minimum of 60% canopy cover would be maintained. Additionally, vegetation density in untreated areas would increase.

Habitat for species requiring a more open habitat would decrease over time with shrub/conifer encroachment and crowded conditions outside of these treatment strips unless maintained by activities such as maintenance under burning.

Alternative 2, 3, and 4 would maintain habitat for species requiring a denser canopy cover because alternative 2 would have buffers to maintain the needed canopy cover and alternatives 3 and 4 maintain a desirable canopy cover. Alternative 2 would be more beneficial than alternative 3 and 4 to species requiring a more open habitat because it proposes a lower canopy cover.

Biomass Utilization
As project activities for biomass utilization are the same, effects are similar to alternative 2.

Road Work, Trails, and Noxious Weeds
As project activities for road work, trails and noxious weeds are the same, effects are similar to alternative 2.

Cumulative Effects
Land ownership in the project area includes a checkerboard of government and privately owned land. This project area is relatively small, encompassing 1,909 acres, representing 6% of the Lower East Fork Illinois 6$^{th}$ field watershed.

As human populations increase in this region, available habitat for native botanical species would decrease. Management and treatment activities would continue to occur on private and BLM lands. Plant species on federal lands would continue to be protected and conserved following policy and management guidelines. Populations on non-federal lands would most

likely remain undetected and unprotected because no laws governing rare plants on non-federal lands exist. Because habitat and populations for the botanical species found are abundant on the resource area, district, and southern Oregon on federal land, impacts associated with the East Fork project would not lead to the listing of any plant species, when considered in conjunction with habitat or plant impacting activities on non-federal land.

Noxious weeds have started to impact plant communities, especially in drainages and along roadsides in the project area. Foreseeable activities in the project area are expected to be similar to past and current activities: motor vehicle traffic, recreations use, timber harvest, and road construction. These types of activities could result in new disturbed sites available for colonization by existing noxious weed populations, and they offer the possibility of introduction of new noxious weed species to under any alternative, including no action. Known populations of noxious weeds on BLM lands are typically treated which is not necessarily the case on non-federal lands. Therefore, populations are expected to increase on private land, but decrease on public land where known populations occur.

## 3.4 Fisheries / Aquatic

### 3.4.1 Affected Environment

The major streams that could be affected by the proposed actions are the East Fork Illinois River, Elder Creek, Little Elder Creek, Khoeery Creek and tributaries, Page Creek, Allen Gulch, Scotch Gulch, and Cedar Gulch. Fish in these streams include fall chinook salmon, coho salmon, winter steelhead, cutthroat trout, Pacific lamprey, western brook lamprey, and sculpin. Southern Oregon/Northern California (SONC) coho salmon are federally listed as threatened. Pacific lamprey is a Bureau tracking species in Oregon. The East Fork Illinois River watershed is a Tier 1 Key Watershed in California, but not in the project area, which is in Oregon. The watershed is identified in the Governor's salmon recovery plan as a core habitat area of critical importance to the maintenance of coho salmon populations.

Current condition for streams and riparian areas is described in the East Fork Illinois River Watershed Analysis (USDA 2000) as being in various stages of recovery from effects of land use and natural catastrophic events. The Oregon Department of Fish and Wildlife (ODFW) has identified fish habitat benchmarks used to determine if a component of fish habitat is a limiting factor in trout or salmon production or survival. In project area streams, large woody debris (LWD), pool depth and frequency, water flow and temperature, and riparian condition have been identified as limiting for salmon and trout production and survival. The ODFW benchmark for pool habitat is that pools comprise >35% of total stream area, adequate riparian canopy is identified as coverage >75%, and >20 pieces of large wood per 100 meters of stream. Water temperatures are elevated above historic ranges on most streams. The main stem of the East Fork Illinois River from the mouth to the California border is 303(d)(1) listed as water quality limited due to summer stream temperatures. Instream water availability is below historic ranges. Stream channels are wider and shallower with less riparian vegetation. The relatively low levels of turbidity are indicators of low to moderate amounts of fine suspended sediment and dissolved solids. There are two gravel push-up dams in the project area which are fish barriers during low flows. Both are on the East Fork Illinois River and on private land. High velocity flows and natural erosion processes are limiting factors for quantity and quality of available vegetative shade on the East Fork mainstem. Large instream wood is scarce and deposited on occasional flood plains and terraces.

### 3.4.2 Environmental Consequences

The following analysis considers the likelihood that the proposed actions of the four alternatives would affect fisheries and aquatic resources, and then assesses the potential magnitude, duration, and nature of effects. The proposed actions are evaluated on how they would change fish habitat, and for this reason, the fisheries analysis is linked closely to the soil and water effects analysis (Soil and Water section 3.1). The effects on habitat are in turn used to evaluate the potential of the proposed actions to affect fish populations through production and survival.

**Alternative 1 - No Action**

Current conditions and trends of channel processes and water quality, and therefore fish habitat, would continue. The area would continue to provide poor quality rearing habitat which limits salmonid growth and survival. Across BLM lands, current sedimentation in spawning gravels do not appear to be a limiting factor for production and survival. Although programmatic road maintenance would continue, improvements proposed in the action alternatives alleviating chronic sediment sources would not occur.

Alternative 1 would have no direct effect on summer stream temperatures. However, the increased risk of a high severity wildfire in the riparian zone could indirectly affect stream temperatures by substantially reducing stream shade. Fish growth and survival are limited by elevated stream temperatures in the EF Illinois mainstem and the lower reaches of tributaries.

The loss of future LWD recruitment potential from a high severity wildfire in the riparian would result in decreasing pool frequency and depth, decreased stream complexity, and decreased salmonid growth and survival through reduced rearing habitat quality. Stream reaches with inadequate levels of instream wood would continue to have low pool frequency and depth, little stream complexity, high stream velocities, and excessive bank erosion.

**Alternative 2**

Road Work

Overall, road maintenance and renovation would maintain downstream salmon survival and production. Road activities would result in sediment reduction and improved road drainage. Road maintenance and renovation have the potential to cause small inputs of fine sediments to stream immediately downstream of culverts, but are not likely to alter fish habitat due to the implementation of PDFs (wet season restrictions, dust abatement, etc.). The amount of sediment delivery would be so small as to not cause an increase in streambed embeddedness, an increase of fines in the gravel, or turbid water in fish habitat.

During road renovation, cross drain culverts that are replaced would be sized according to 100-year flood criteria. The reduction in sediment delivery resulting from the renovation of problem roads would reduce the risk of egg suffocation. The risk of direct or latent mortality to juvenile fish from sediment delivery is less than with the no action alternative. Therefore, road maintenance and/or renovation would have negligible effects to salmonid migration, spawning, egg incubation, rearing, and feeding.

No cumulative adverse affects from the proposed road work are anticipated because no new roads would be added, existing roads which are current sources of sediment would be renovated or decommissioned, and only a small percentage of the watershed would be involved in the

proposed action (Soil and Water 3.1). The production and survival of salmonids would be maintained.

Trail Maintenance and Development

Existing trails along historic mining ditches in Section 34 are proposed for maintenance and improvement. Trail work would create ground disturbance only where existing segments are connected into continuous loops to improve the recreational use of the non-motorized trail system. There would be no negative impact on the channel network in Allen Gulch and no effect on the fish habitat downstream because of distance of trail work from the stream network and because of the extremely small amount of sediment that, even if it reached the stream network, would not be discernible from existing levels of sediment input.

Riparian Vegetation Treatments

*Harvest*. Both perennial and intermittent streams are proposed for treatment. Vegetation treatment prescriptions in the Riparian Reserve were developed to meet objectives for ecosystem function that tier to the ACS. The proposed harvest treatment is a density management thinning in the riparian reserves to accelerate the development of late-successional forest conditions. There would be no reduction in streamside shade or large instream wood recruitment.

Riparian reserve treatments would result in late-successional forest conditions with increased structural diversity, canopy, and large woody debris recruitment, and improved stream complexity and water quality. Salmonid production would increase as improved channel function results in increased adult holding areas and improved gravel retention. Improved rearing habitat resulting from increased stream complexity would increase juvenile survival.

PDFs would minimize the potential to negatively affect fish and aquatic habitat. Tractors would operate in riparian areas that have slopes <35%, and logs would be lined to existing or designated skid trails, which would be decompacted following use. Treatments in riparian reserves would not reduce canopy cover below 50%, with the overall long term target of 60-70%. Vegetation in the primary shade zone of perennial streams would be retained because of the 50' no treatment area next to the channel, thereby protecting water quality.

*Fuels***.** Fuels reduction would take place where activity fuels are generated in the harvest treatments described above. In addition, natural fuels would be treated in Section 24 where Little Elder Creek flows tangentially to the boundary of BLM land. Fuel treatments include handpile and burning, slashing, and underburning. Mechanical treatments and prescribed burning would be restricted to areas outside of no treatment zones.

Small woody material would be consumed during prescribed burning, but LWD would be left largely intact. Low intensity fires have a low risk of killing large overstory trees or consuming snags. Future recruitment of LWD and shade would not be reduced by burning in the riparian reserve. Handpiles would not be burned within 50' of stream channels. Although these piles burn down to mineral soil, sediment would not migrate beyond the unburned litter around the pile. Following underburning, potential for sediment and ash transport to fish habitat is low because of the unburned strip of vegetation and organics along streams and the mosaic pattern of unburned vegetation outside the no treatment zone; therefore, no sediment routing mechanisms would be created. The potential for sediment transport resulting from these burns would coincide with intense rainfall and high winter flows and would not be distinguishable from baseline sediment loads. There would be no changes to the channel environment that would adversely affect fish or fish habitat.

In Alternative 2, approximately 270 acres in Riparian Reserves would be treated for fuel reduction through biomass utilization. Effects from biomass treatments and subsequent underburning and handpile burning would be the same as for the fuel treatments described above for activity generated fuels and natural fuels. The use of designated skid trails from harvest treatments would prevent additional soil disturbance from the biomass treatments.

**Cumulative Effects**

The potential effects described above are minimal or negligible in this alternative because of the efforts to eliminate sediment delivery mechanisms and disturbance through PDFs. Riparian functions of streamshade and large wood recruitment would be maintained and/or improved. There would be no increase in peak flows. Therefore, there would be no measurable adverse changes to aquatic habitat or fish at the 6th or 5th field watershed scales.

There are no additional reasonably foreseeable actions on BLM land in the subwatershed. On National Forest lands, a plantation thin project consisting of 1,150 acres of thinning across the EF Illinois 5th field watershed is being planned. Over a ten year period, <2% of the watershed would be thinned. Private lands are assumed to continue to harvest on a rotation schedule in accordance with ODF guidelines. The watershed's poor riparian structure, inadequate large woody debris, and elevated summer water temperatures are expected to continue. The harvest management of riparian forest stands on a short (approximately 40-60 year) rotation on private timber land is not likely to accelerate watershed recovery. However, if the proposed actions are taken on federal lands, currently degraded riparian areas would have the opportunity to move more quickly toward recovery.

In conclusion, based on this analysis of potential impacts, the proposed actions would not likely disrupt normal behavior patterns such as migration, spawning, egg incubation, rearing and feeding. Habitat would not be degraded. The habitat would be expected to improve as late-successional forest develops in the riparian.

**Alternative 3**

Road Work
Road maintenance and renovation would be the same in this alternative as in Alternative 2; and accordingly, the impacts would be the same. There would be no construction of temporary spur roads or landings as no commercial harvest is proposed.

Trail Maintenance and Development
As trail maintenance and development proposals are similar to alternative 2, effects are expected to be the same.

Riparian Vegetation Treatments
*Harvest.* No harvest would occur in riparian reserves. Therefore, benefits to streams due to thinning in riparian reserves as identified in Alternative 2 would not be realized in this alternative. Riparian stands would be maintained as described in Alternative 1 (No Action).

*Fuels.* Fuel hazard reduction in Alternative 3 would emphasize areas in the CAR and other strategic locations. Activity fuels would not occur in riparian reserves. Therefore, the total acres of riparian fuel treatments would be approximately half of that described for Alternative 2.

Biomass utilization treatments would use the same ground-based methods as described in Alternative 2. Because harvest would not precede fuel treatments in Alternative 3, skid trails would be pre-existing; none would be built in riparian reserves for biomass extraction. The impacts anticipated would not exceed those described for biomass utilization in Alternative 2. The Soil and Water analysis (Section 3.1) concluded that there would be no measurable effect to water quality and channel conditions as a result of Alternative 3. Therefore, there are no causal mechanisms which would affect fish and aquatic resources. Degradation to habitat would not occur. The proposed actions would not disrupt normal behavior patterns such as migration, spawning, egg incubation, rearing and feeding.

**Cumulative Effects**

There are no cumulative effects anticipated from this alternative due to the absence of causal mechanisms which could affect fish and aquatic resources.

**Alternative 4**

Road Work
Road maintenance and renovation would be the same in this alternative as in Alternative 2; and accordingly, the impacts would be the same. Construction of temporary spur roads and landings would take place to facilitate commercial harvest as in Alternative 2.

Trail Maintenance and Development
As trail maintenance and development proposals are similar to alternative 2, effects are expected to be the same.

Riparian Vegetation Treatments
*Harvest.* Proposed harvest in the riparian reserves is the same density management thinning treatment as in Alternative 2 but with a 20% reduction in the number of acres treated. Effects are similar to those described in alternative 2.

*Fuels.* Natural and activity generated fuels in matrix and riparian reserve would be treated and have similar effects to those described in alternative 2. Biomass utilization of fuels would take use the same ground-based methods analyzed for impacts in Alternative 2. Effects from biomass treatments and subsequent underburning and handpile burning would be the same as described for alternative 2.

In conclusion, based on this analysis of potential impacts, the proposed actions would not likely disrupt normal behavior patterns such as migration, spawning, egg incubation, rearing and feeding. Habitat would not be degraded. The habitat would be expected to improve as late-successional forest develops in the riparian reserves.

**Cumulative Effects**

The potential effects described above are negligible in this alternative because of the efforts to eliminate sediment delivery mechanisms and disturbance through PDFs. No cumulative effects were identified in the analysis of impacts to soil and water (See Section 3.1). Therefore, no cumulative effects to fish and aquatic habitats would be expected to result from the proposed action in this alternative at the project area, 6$^{th}$ or 5$^{th}$ field watershed scales.

## 3.5 Wildlife

### 3.5.1 Affected Environment

BLM manages approximately 5,027 acres (16%) of the 30,823 acres in the Lower East Fork Illinois 6th field watershed and 1,909 acres (35%) of the 5,463 acres within the East Fork Illinois project area. The US Forest Service manages approximately 9,576 acres (31%) of the watershed with the remainder (16,220 acres (52%)) in private ownership.

Southwest Oregon mixed conifer-hardwood forest is the predominant vegetation type in the project area (Chappell and Kagan 2001). This vegetation type is composed of mixed conifers (primarily Douglas-fir, sugar pine, ponderosa pine, incense cedar and hardwoods (primarily madrone). Stands in the project area are in various stages of stand development though there are some noticeable trends such as encroachment of Douglas-fir into pine stands and brush encroachment into otherwise open plant communities associated with serpentine or ultramafic soils such as Jeffrey pine savannahs. Other habitat types are Westside Oak and Dry Douglas-fir Forest and Woodlands, Ceanothus-Manzanita Shrublands and Westside Riparian-Wetlands (Chappell and Kagan 2001).

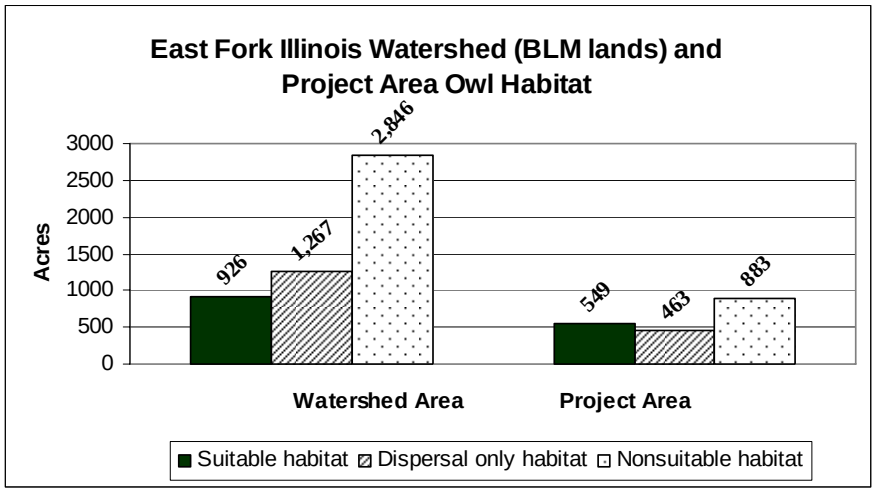
Since completion of the East Fork Illinois Watershed Analysis in 2000, the Bureau Special Status Species list has been updated, and there have been several changes in management direction specifically as they relate to the NWFP S&M Mitigation Measures. This has resulted in some differences between the discussions found in the watershed analysis (USDI BLM 2000) and those in this section concerning species and habitats.

The red tree vole (RTV) and Great Gray Owl (GGO) are S&M species. Under the newly released Draft Environmental Impact Statement to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines (July 2006) (DEIS), RTV, without mitigation measures, habitat would be insufficient to support stable populations in the Xeric Zone. With retention of Riparian Reserves, the likelihood of extirpation in the NWFP area would be zero percent and would likely provide sufficient habitat to provide for stable, well-distributed populations across this area (DEIS p. 90).
GGO surveys were completed in the project area per S&M policy and protocols in effect at this time; RTV surveys have been completed and tree climbing to confirm status of nest trees located is currently underway (USDA & USDI 2000; 2001a; 2001b; 2002a; 2002b; 2003a; 2003b; 2004). (See specific sections on GGO and RTV for survey results.) Additionally, extensive protocol surveys were conducted to locate and color band spotted owls across the Grants Pass Resource Area and in the project area during the early 1990s.

Since the late 1800s, timber harvest and fire suppression have replaced natural disturbance as the primary forces shaping forest landscapes. Perhaps the most important consequence of timber harvest has been the significant reduction in amounts of old growth forest on private land and its fragmentation on federal land. A significant proportion of low elevation forest land in western Oregon has been converted to other uses, primarily agriculture and suburban development, resulting in both fragmentation and loss of forest habitat (Rochelle 1998). Fire suppression has resulted in over-dense stands for some wildlife species, and encroachment of shrubs and trees into open, edaphic-influenced plant communities, influencing the wildlife species composition of those communities.

Habitat in the project area lands was typed utilizing the McKelvey rating system (see Appendix F for description). This habitat typing system was designed specifically for spotted owls, but can be used to assess habitat availability for other species because the habitat typing accounts for habitat condition and structure important to other species. On BLM lands, the Lower East Fork Illinois sub-watershed currently contains approximately 926 acres of suitable nesting, roosting and foraging (NRF) spotted owl habitat, or approximately 6% of the 14,603 acres of federal lands (BLM and FS) in the watershed. There are approximately 1,267 acres (4% of federal lands) of dispersal only habitat (suitable habitat is also dispersal habitat) and 2,846 acres (19%) of non-suitable habitat. Because of agricultural and rural development, not all lands in the watershed are capable of becoming suitable NRF habitat. The valley bottom is composed of developed lands, hardwood forest, riparian hardwood and mixed conifer /hardwood stands that are not capable of sustaining NRF habitat. Additionally, there are 1,336 acres of serpentine influenced brush or Jeffrey pine habitat that is incapable of becoming NRF. The project area currently contains approximately 549 acres (29% of the 1,907 acres in the project area) of suitable owl habitat, 463 acres (24%) of dispersal only habitat and 883 acres (46%) of non-suitable habitat (Figure 1). The project area supports 59% of the suitable habitat in the lower EF Illinois subwatershed.

**Figure 1. Spotted Owl Habitat in the Watershed and Project Area**




Over the past 10 years implementation of the NWFP across federal lands has resulted in considerable change in forestry practices (Thomas et al. 2006). The overall trend towards the recovery of the Northern Spotted Owl (NSO) and old growth and late-successional forest related species has improved (USFWS 2004).

Habitats in the project area will be discussed as they relate to Special Status Species (SSS) and S&M species. There is one federally threatened species (NSO), three Bureau Sensitive species (Pacific fisher, Northern Goshawk and Townsend's big-eared bat) and two Bureau Assessment species (fringed myotis and Pacific pallid bat) that are known or suspected to occur in the project area.

Consultation with the USFWS regarding any T&E species potentially impacted by the project has been completed as required by Endangered Species Act (USFWS 2003, log #1-15-03-F-511). This project and the expected effects to spotted owls comply with this formal consultation with the USFWS. Although this BO was the subject of a lawsuit, the only portion of the BO found deficient addressed spotted owl designated critical habitat. The EF Illinois project does not

contain spotted owl designated critical habitat, therefore, this BO is valid for this project. Additional consultation would be conducted if: (1) new information reveals that the effects of the proposed action may affect listed species or critical habitat in a manner or to an extent which was not considered in the biological opinion; (2) the proposed action is subsequently modified in such as way as to cause an effect to a listed species or critical habitat in a manner or to an extent not considered in the biological opinion; or (3) a new species is listed or critical habitat is designated that may be affected by this action.
This project is in conformance with the 2001 ROD (USDA, USDI 2001) for Survey and Manage as outlined in the NWFP.

### 3.5.2 Environmental Consequences

If no habitat is present in the project area or the area is outside the range of a species, no further analysis is needed. If habitat is present, but no activities are planned for that habitat, then no further analysis is needed. If a threatened, special status sensitive or assessment, or S&M species is known or suspected to be present and habitat is proposed to be disturbed, then effects on the species would be analyzed (see Appendix F for the list of Special Status Species considered).

**Species Associated with Late-Successional Habitat**

There are a number of species or groups of species that are strongly linked to features found in late-successional forests, commonly referred to as late-successional / old growth associated species. Rochelle (1998) observed that small amounts of habitat structure maintain many species assumed to be late-successional associates at levels statistically inseparable from levels in old growth stands. This is important as it suggests that at least some late-successional species can be maintained in managed stands by retaining suitable levels of required habitat elements, though likely at lower levels than intact forests. Other species, such as spotted owls, require more intact, closed canopy forests for successful reproduction and some species require closed canopy forests for dispersal.

As the 2001 S&M ROD, and associated Annual Species Reviews (USDA USDI 2001c; 2002c; 2003c) were reinstated after project proposals were developed, project acres (Appendix B) show acreage without implementation of S&M management recommendations. This is particularly relevant in light of red tree vole nest sites. Therefore, the effects below include acreage as proposed (Appendix B), and acreage as modified by red tree vole buffers.

***Northern Spotted Owl***

**Affected Environment**
Spotted owls are closely associated with old forests for nesting, foraging, and roosting throughout most of their range (Forsman, et al. 1984, Carey et al. 1990, Solis and Gutierrez 1990). The NSO was federally listed as a threatened species in 1990. There is no spotted owl critical habitat in the project area. Standards and Guidelines of the NWFP established 100 acre late-successional reserves (cores) protecting the best quality habitat near nest sites and activity centers known to exist as of January 1, 1994.

There are two historic spotted owl sites in the project area, neither of which has a designated core area because they were located after January 1, 1994. No additional spotted owl home ranges overlap the project area. Very few surveys have been conducted at these 2 sites in the last 5 years. No spotted owls were detected during surveys at one site in 2001. The second site was

first found in 2001 at which time a non-reproductive pair was located. Surveys in 2005 did not locate any owls. Based on response history, this pair likely nests on Forest Service lands south of the project area. An owl pair may use several different nest trees over the years, but the pair usually continues to spend the majority of their nesting and roosting time in a 125 acre activity center (pers. comm. Jim Harper, BLM Wildlife Biologist 2005).

The Northern Spotted Owl Five-year Status Review was completed by the U.S. Fish and Wildlife Service (USFWS) in 2004. There are four reports including the Status Review which are important to the Review: 1) *Scientific Evaluation of the Status of the Northern Spotted Owl* (Sustainable Ecosystems Institute, Courtney *et al.* 2004); 2) *Status and Trends in Demography of Northern Spotted Owls, 1985-2003* (Anthony *et al.* 2004) 3) *Northern Spotted Owl Five Year Review: Summary and Evaluation* (USFWS, November 2004); and 4) *Northwest Forest Plan – The First Ten Years (1994-2003): Status and trend of northern spotted owl populations and habitat, PNW Station Edit Draft* (Lint, Technical Coordinator, 2005). To summarize these reports, although the agencies anticipated a decline of NSO populations under land and resource management plans during the past decade, the reports identified greater than expected NSO population declines in Washington and northern portions of Oregon, and more stationary than expected populations in southern Oregon and northern California. The reports did not find a direct correlation between habitat conditions and changes in NSO populations, and they were inconclusive as to the cause of the declines. Lag effects from prior harvest of suitable habitat, competition with Barred Owls, and habitat loss due to wildfire were identified as current threats; West Nile Virus and Sudden Oak Death were identified as potential new threats. It was surmised that complex interactions are likely among the various factors affecting spotted owls throughout their range. This information was evaluated in regard to the NWFP and the RMP, and has not been found to be in conflict with the NWFP or the RMP (Medford District BLM 2005).

In the Klamath Province of California, Franklin et al. (2000) found a positive relationship between habitat heterogeneity and NSO reproductive output. This research found that annual survival of spotted owls was positively associated with both amounts of interior old growth forest and length of edge between those forests and other vegetation types. Treatments which retain interior forest conditions and increase edge could provide an increased chance of survival, but could negatively affect reproduction (Franklin et al. 2000). Interior forest conditions likely decreased exposure to predators, but reduced prey availability which, at least in southern Oregon, prefer edge habitat (see prey species discussion below for more detail).

**Alternative 1 - No Action**

Current habitat in the two spotted owl home ranges in the project area and in the watershed would continue to develop along their current successional pathways. Stand conditions in the project area are susceptible to wildfire, disease, insects and competition from shade tolerant species. Current stand conditions reflect past fire suppression; fuel loading and ladder fuel conditions make spotted owl habitat susceptible to higher fire severity potential. Wildfire would remain the most immediate hazard to spotted owl habitat (Courtney et al. 2004), increasing the risk of loss of large diameter remnant conifers important to spotted owl nesting success. Wildfire could remove or downgrade habitat randomly across the landscape, setting back succession and development, and likely reduce large tree structure critical to spotted owl nesting success. Additionally, fire severity may be higher than historical due to current stand conditions, prolonging the recovery of mycorrhizae, macroinvertebrates and small mammalian prey food webs important for providing suitable foraging for spotted owls.

The current successional trend of stands toward late-successional habitat under Alternative 1 is uncertain. In southwest Oregon, the reduction in fire frequency has reduced the role of fire as an ecological factor influencing stand development, and has altered historic forest structures, processes and functions. As a result, young stands are on a developmental pathway different than old growth stands. Therefore, the currently abundant young forest stands would likely develop stand structures and species compositions very different than that of old growth. Further, both the young and old forest stands are increasing in density, placing them at an increasing risk of accelerated density related mortality and increased fire severity (Sensenig 2002). Additionally, they could develop into stands with less complex structures and species compositions than that of old growth stands (Sensenig 2002). Alternative 1 may fail to maintain or develop large diameter conifers in the project area, and over time these habitat structures would be lost, potentially with negligible future recruitment.

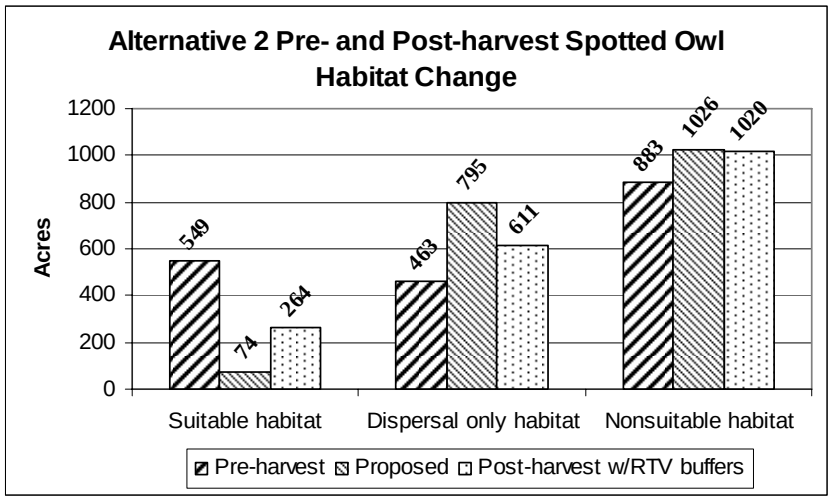
**Alternatives 2, 3 and 4**

Under alternatives 2, 3 and 4, actions are proposed within known spotted owl home ranges. The discussion and figures below (Figures 2, 3, & 4) address the actual harvest that could occur with incorporation of RTV buffers.

In alternative 2, timber harvest is proposed in 285 acres of suitable NRF habitat, and in alternatives 3 and 4, harvest is proposed in approximately 98 acres and 260 acres, respectively. In the following discussion, degraded means that habitat remains suitable, retaining snags and coarse wood important to successful owl nesting, and a minimum 60% canopy closure, but habitat is of lower quality. Downgraded means that NRF habitat has been downgraded to dispersal habitat. NRF removed means that canopy closure is reduced to <40% in NRF habitat resulting in nonsuitable habitat. Dispersal removed means that canopy closure is reduced to <40% resulting in habitat which does not meet any needs for spotted owls. Dispersal habitat is "dispersal only" and does not include suitable habitat which also meets owls' needs for dispersal.

Alternative 2 would remove five acres (<1%) of suitable habitat and downgrade approximately 280 acres (51% of the project area and 30% of the sub-watershed) of suitable habitat into dispersal. Dispersal habitat would increase by a net 148 acres (32%) (increase by 280 acres from suitable degraded and decrease by 132 acres by dispersal downgraded) and non-suitable habitat, due to habitat removal (132 acres of dispersal downgraded plus five acres of suitable removed), would increase by 137 acres (30%) within the project area (Figure 2 and Table 14).

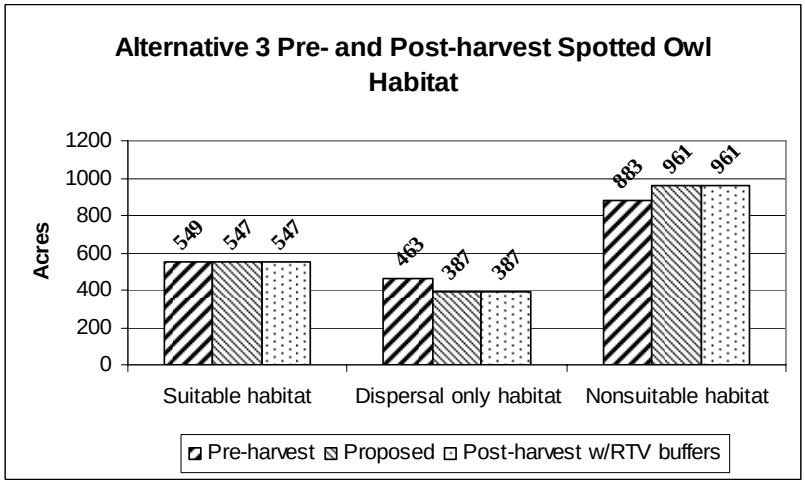
**Figure 2. Alternative 3 Spotted Owl Habitat with RTV Buffers***




Note: Dispersal habitat is dispersal only and does not include NRF which also functions as dispersal habitat.
* Post harvest includes a reduction in acres from the proposed harvest because of RTV buffers.

With alternative 3, approximately 96 acres (17%) of NRF would be degraded from the Selective Cut prescription; however, this habitat would continue to be suitable habitat as no overstory canopy reduction would occur in suitable habitat, and habitat characteristics known to be important to spotted owls would be retained. This alternative may also remove 2 acres (<1%) of suitable habitat because this prescription is proposed for pine dominated stands which generally do not support a 40% canopy, and treatments may reduce canopy to less than 40%. However, with reduced stand densities, stand conditions should improve, and vegetation would be more sustainable in the long term in these pine stands. Nonsuitable habitat would increase by approximately 78 acres (9%) (Figure 3, Table 14) because of reduction in canopy to less than 40% in pine stands.

**Figure 3. Alternative 3 Spotted Owl Habitat with RTV Buffers***

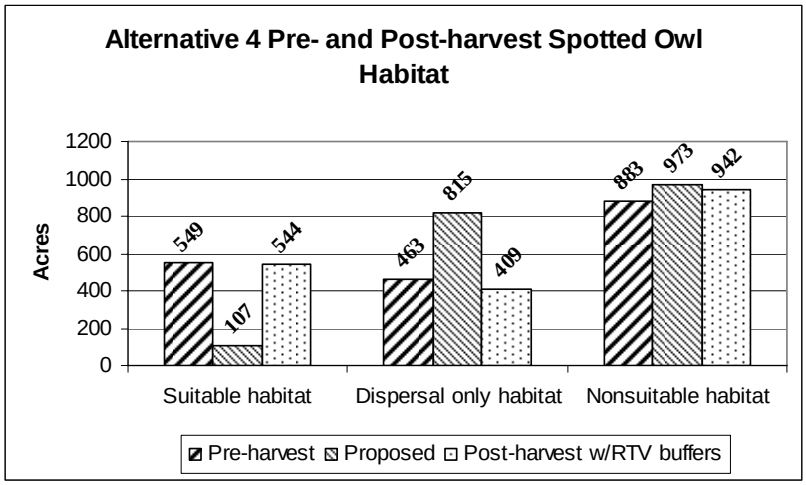



Note: Dispersal habitat is dispersal only and does not include NRF which also functions as dispersal habitat.
*Postharvest includes a reduction in acres from the proposed harvest because of RTV buffers.

In alternative 4, Density Management would degrade up to 255 acres (46%), however, the habitat would remain suitable since 60% canopy and habitat characteristics important to spotted owls (snags, down wood) would be retained. Alternative 4 may remove up to 5 acres of suitable habitat and 54 acres of dispersal habitat through Restoration Thinning, which decreases canopy closure to less than 40% in pine dominated stands. This alternative would increase nonsuitable

habitat by 59 acres (7%). Dispersal only habitat would decrease by 54 acres (12%) because of reduction in canopy closure.

**Figure 4. Alternative 4 Spotted Owl Habitat with RTV Buffers***




Note: Dispersal habitat is dispersal only and does not include NRF which also functions as dispersal habitat.
*Postharvest includes a reduction in acres from the proposed harvest because of RTV buffers.

**Table 14. Spotted Owl Effects: Comparison of Alternatives**

| Alternative | Habitat | Pre-harvest | Proposed | Post harvest* |
|---|---|---|---|---|
| 2 | Suitable | 549 | 74 | 264 |
| | Dispersal only | 463 | 795 | 611 |
| | Nonsuitable | 883 | 1026 | 102 |
| 3 | Suitable | 549 | 547 | 547 |
| | Dispersal only | 463 | 387 | 387 |
| | Nonsuitable | 883 | 961 | 961 |
| 4 | Suitable | 549 | 107 | 544 |
| | Dispersal only | 463 | 815 | 409 |
| | Nonsuitable | 883 | 973 | 942 |

*Postharvest acres include RTV buffers.

Habitat modification through commercial harvest described for alternatives 2, 3 and 4 could result in a short term change in behavior patterns that would require owls to expend more energy by maintaining a larger home range and traveling greater distances to forage. Alternative 2, with reduction in canopy closure, could result in reduced survival, productivity, and occupancy of known sites in the long term (Meiman et al. 2003). Note, however, that there are no known occupied sites in the project area, and therefore, these effects are unlikely to occur. Alternatives 3 and 4, which, except for two and five acres respectively, retain suitable habitat where it currently exists, but if owls were present in the project area, could cause some shift in behavior patterns because of degrading of habitat. However, habitat would remain suitable, effects are expected to be short term because of canopy retention requirements of these alternatives, and no reduction in survival, productivity or occupancy of sites is expected (Franklin et al. 2000).

In addition to timber harvest units, a small number of roadside hazard trees would be felled. The impact on habitat of hazard tree removal would be negligible as minimal canopy reduction would occur through felling of these trees which are generally snags.

Restoration projects such as prescribed burning, wildlife habitat restoration and trail development would have minimal effects on owls and their habitat. Road projects would have no impact because of seasonal restrictions. Furthermore, roads would be blocked after use. With the proposed road renovation and trail improvements, access would increase, potentially leading to increased human disturbance from use of trails during the nesting season; however, use would normally be short term while trail users passed by the nest site and owls are known to tolerate human presence. Fuel hazard reduction and thinning under all action alternatives may impact foraging by changing habitat conditions for prey, but would not downgrade suitable habitat.

Seasonal restrictions would be in effect for all proposed activities occurring in units within ¼ mile of historic spotted owl nest sites (RMP p. 55). This protection would prevent disturbance during the breeding season and would avoid any negative effects to reproduction from disturbance.

Effects to Spotted Owl Prey Species

Effects to NSO prey would affect spotted owls. Taken in whole, project activities would lead to an increase in "edge" or ecotonal habitats. While this would degrade or downgrade suitable owl habitat, this may increase prey species populations and allow spotted owls to adjust habitat use to adapt to the changes in habitat quality for nesting, roosting and foraging by reducing energetic costs of foraging.

Woodrats, the primary prey of spotted owls in southwest Oregon (Forsman et al. 2004, Zabel et al. 1995), are more vulnerable to predation at habitat edge openings. Dusky-footed woodrats are found in high densities in early seral or ecotonal habitats (Sakai and Noon 1993, 1997). Sakai and Noon (1993) found that dusky-footed wood rats may benefit from some thinning or harvest which would increase shrub and pole stands. Bushy-tailed woodrats depend more on cover and food availability than on seral stage, and they often use areas previously disturbed by fire (Carey 1991). Flying squirrels would likely respond negatively to habitat fragmentation, resulting in lower abundance of this species. Therefore, project activities are likely to decrease the energetic costs of foraging for owls because of increased foraging opportunities along edges, and may, in turn, lead to increased productivity of owls.

In all units, a legacy component of large, green conifers would be retained to provide the unique structure and functions associated with these large old trees (RMP 47). The retention of legacies can accelerate the pace of ecosystem recovery such that the rate of change in a new, self-organizing community would be rapid and prey species would be affected differentially (Franklin et al. 1997); reduced abundance of some species and an increase in others. Legacies also provide perching structure for spotted owls that could allow opportunistic foraging in the uncharacteristic environment of degraded habitats because prey populations could be high. This could decrease energetic demands of foraging, but with a cost of increased exposure to predators. Spotted owl foraging would return to pretreatment patterns after canopy closures recovers to 60% (10-15 years) and forest floor rodent (prey) populations increase (Meiman et al. 2003, Wilson and Carey 2000).

The CT/MGS treatments (40% canopy closure maintained) would likely reduce flying squirrel populations through reduced truffle production and fragmentation of arboreal travel ways (Colgan et al. 1999, Carey 2000b). There may be short term impacts on truffle production, flying squirrel abundance, and owl foraging, but habitat and prey populations recovery should be rapid as stands would provide residual habitat that would recover more quickly than if treated with more aggressive prescriptions (clear cutting, regeneration harvest). Stands with 40%

canopy closure would likely be utilized more for dispersal than foraging. Thinned stands with 60% canopy closure would degrade flying squirrel habitat and truffle production but would likely maintain arboreal travel ways. CT/MGS may accelerate the development of spotted owl habitat and dense prey populations especially when decadence (snags, cavity trees and down logs) is provided for, as in this project. The CT/MGS prescription increases tree growth, crown differentiation, understory development, and understory plants' flowering and fruiting (Buermeyer and Harrington 2002, Wender et al. 2004), which provide ancillary foods to spotted owl prey. Fuel hazard reduction and thinning under all action alternatives may impact foraging by changing prey habitat conditions; treatments may create "edge" and degrade suitable owl habitat; however, research indicates that owl productivity is enhanced by having an edge component in the home range (Franklin et al. 2000, Zabel et al. 1995).

In any case, in southwestern Oregon, brushy-tailed and dusky-footed woodrats, flying squirrels, and red tree voles can be abundant in the same stand. The mosaic of different seral stages and species composition in the project area can provide diverse patches of habitat with an abundance of one or more of these prey species (Zabel et al. 1995). Spotted owls could exploit untreated areas without increasing their home range by shifting their foraging use patterns within the same approximate area. This situation is unique in the range of the spotted owl and the abundance of prey would likely minimize the need to expand their home range in response to timber harvest.

In summary, for alternative 2, approximately 280 acres of suitable spotted owl habitat would be downgraded to dispersal habitat. In alternatives 3 and 4, approximately 96 and 255 acres, respectively, of suitable habitat would be degraded, but would retain suitable habitat characteristics and remain suitable for spotted owl nesting, roosting and foraging. Approximately 5 acres of suitable habitat in alternatives 2 and 4, and 2 acres in alternative 3, would be removed, because of reduction of canopy closure to less than 40%. Alternatives 3 and 4 would result in short term impacts to prey availability and a potential shift in owl use of that habitat. Alternative 2 would have greater effects on prey species and could additionally lead to decreased survival and productivity of spotted owls in the project area. However, there are no known sites in the project area and these effects are unlikely to occur. Additionally, in the long term, habitat conditions should improve because of increased stand vigor and health. The effect of alternatives 2, 3 and 4 to the spotted owl and its habitat would downgrade, degrade and remove spotted owl habitat that would result in short term impacts to prey availability. All alternatives may result in a shift of habitat use by owls. Alternatives 3 and 4 are unlikely to negatively affect reproductive success because of minimal downgrading of suitable habitat. Alternative 2, and to a lesser extent alternative 4, may lead to an increase in vulnerability to predation; however predation is not considered a major influence on population dynamics or behavior (USFWS 2004). The Northern Spotted Owl Five-year Review: Summary and Evaluation (USFWS 2004) states, "At this point, a strong effect of predation is best regarded as an untested hypothesis which, while possible, lacks any empirical support, and is not favored by circumstantial evidence (Courtney et al. 2004)." At the NWFP scale, alternatives 2, 3 and 4 would have no effect to spotted owl population demographics (USDI, USFWS 2003; USDI, USFWS 2004). In any case, the two spotted owl sites in the project area are unlikely to experience these impacts as one site has not been found to be occupied in recent surveys and the other likely nests to the south of the project area on Forest Service lands. This project and the expected effects to spotted owls are compliant with formal consultation with the U.S. Fish and Wildlife Service (USFWS) issued in the Biological Opinion (#1-15-03-F-511, 2003).

*Northern Goshawk*

**Affected Environment**

The Northern Goshawk, a Bureau Sensitive species, is found in a variety of mature, deciduous and coniferous forest types. Nesting habitat consists of mature forest with high canopy closure and an open understory. Goshawks may occur in the watershed, although likely in low numbers. Suitable habitat is in the project area but no nests have been found and there are no historic records of nesting in the watershed. Goshawks are rarely found in the Grants Pass Resource Area; the only known historic nest is near Galice, approximately 34 air miles from the project area. Their absence may be due to the brush and small diameter trees in the understory of many stands. Fire exclusion may have reduced the suitability of some stands for goshawk by allowing the understory to develop.

A petition to list the Northern Goshawk in the western United States as a threatened species was considered by the U. S. Fish and Wildlife Service (USFWS) in 1998 and the final conclusion was published that year (Federal Register, Vol. 63, No. 124, June 29, 1998, 35183-35184). USFWS found no evidence to support the contention that the goshawk was in danger of extinction or that the species was likely to become endangered in the foreseeable future.

Spotted owl habitat, as defined by the McKelvey rating system, incorporates habitat structure and canopy closures important to Northern Goshawks. Therefore, the McKelvey rating system is used for assessing the impacts of the alternatives to the Northern Goshawk.

**Alternative 1 - No Action**

Effects of the no action alternative were described above for the spotted owl and are relevant for the Northern Goshawk, because the impacts to goshawk habitat structure and conditions would be the same (Reynolds et al. 1992). In summary, habitat would continue its current successional pathway and may restrict goshawk nesting because of high stand densities.

**Alternatives 2, 3 and 4**

Effects of alternatives 2, 3 and 4 for the spotted owl were described above and are relevant to the Northern Goshawk, because habitat and prey species use are similar (Reynolds et al. 1992). However, use of habitat is different and goshawks would likely respond to the action alternatives by foraging more in thinned stands than would owls. Goshawks are habitat generalists and thinned stands would provide more suitable foraging habitat, with unimpeded flight paths. The ecotonal edge (between two habitat types) created by treatments would likely benefit goshawk foraging for prey species.

Though there are no known nests in the project area, noise disturbance from timber sale operations could impact goshawks during the breeding season. If an active nest is found, seasonal restrictions (Table 6) would be imposed on units near active goshawk nest sites which would minimize that disturbance and likely prevent nest abandonment. Goshawks are highly mobile habitat generalists and could further avoid disturbance by utilizing more distant habitat in the project area and watershed.

***Great Gray Owl***

**Affected Environment**

The Great Gray Owl is a S&M and Bureau tracking species. There is potential GGO reproductive habitat in the project area. The GGO forages in open areas such as meadows or clear cuts, conifer forests, and oak woodlands (USDA and USDI 2002b). GGOs nest in a variety of stand types, but appear to prefer mature park like stands with a closed canopy (>60%) and an open understory with room for flight. Nests are in tree cavities, large broken-top snags, or abandoned raptor, corvid (jays, crows, ravens, etc.), or squirrel nests. Historic numbers of GGOs across their range are unknown. The GGO diet consists mostly of small mammals, particularly voles and pocket gophers. The young leave the nest before they can fly and need leaning trees to enable them to climb up off the ground.

Studies show logging can create "temporary meadows" capable of supporting rodent populations used by breeding GGOs. Unlike naturally occurring mountain meadows, forest clearings created by logging undergo rapid forest reestablishment. Therefore, successional development makes the usefulness of such openings short lived.

In this project, surveys were conducted to protocol along meadows, clear cuts and lower elevations in the project area (USDA and USDI, 1995 with subsequent modifications (BLM-Information Bulletin No. OR-97-311)). None were detected. Since the late 1990s, 11 landscape management project areas evenly distributed across the Grants Pass Resource Area have been surveyed for GGOs using the two year survey protocol. Only one project area on the Grants Pass Resource Area (east of Williams approximately 16 miles distance) has documented nesting GGOs. These are the closest known sites to the project area. Additionally, no nesting territories have been detected west of Williams on either Forest Service or BLM lands (ISMS database).

**Alternative 1 - No Action**

Forested stands would continue to develop along current successional pathways. Successional stand development would continue to be influenced by fire suppression, high stem densities and ladder fuels. The risk of stand replacement fire events would remain at current levels or increase, which would impact habitat if a large, severe fire were to occur. Foraging areas would continue to be encroached upon by fire intolerant plant species, thereby reducing potential foraging opportunities.

**Alternatives 2, 3 & 4**

Alternatives 2, 3 and 4 propose treatment in potential GGO habitat. Because no owls were located during protocol surveys in suitable habitat, it is unlikely that treatments would have a negative effect on this species. However, treatments in alternative 2 would modify potential nesting habitat to a non-nesting condition. Short term effects for alternative 2 includes reducing canopy closures and stand structural complexity and opening stands, which would provide opportunities for predators such as the Great Horned Owl to become established because of unobstructed flyways; however, as no GGOs are present in the project area, this effect is unlikely to occur. Long term benefits of this alternative include the accelerated development of late-successional forest habitat conditions in areas not currently supporting suitable habitat, and forage enhancement due to thinning and burning (see prey discussion for spotted owls, above).

Alternative 3 proposes treating similar acreages to alternative 2. However, alternative 3 would not degrade nesting and roosting habitat for owls and may not accelerate forest stand development because of continued high stand densities; however, removal of understory suppressed and intermediate trees would provide for a more open understory on approximately 653 acres in suitable nesting habitat. Alternative 4 would have effects similar to alternative 3 because a 60% canopy closure would be retained.

### *Pacific Fisher*

**Affected Environment**

The Pacific fisher was petitioned for listing as endangered or threatened under the Endangered Species Act on three occasions. In 2004, the USFWS determined that listing fishers as threatened was warranted but was precluded by higher priority listing actions (Federal Register Vol. 69, No. 68, April 8, 2004, 18769-18792). The species remains a USFWS candidate species (USDI, USFWS 2004).

In the western United States, fishers are associated with extensive mature conifer forests and elements such as old live trees, snags, and large logs (Harris et al. 1982, Rosenberg and Raphael 1986, Weir and Harestad 2003, Zielinski et al. (in press), Zielinski et al. 2004). Fishers are associated with low to mid-elevation forests containing a coniferous component, large snags or decadent live trees, logs for denning and resting, and complex physical structure near the forest floor to support adequate prey populations (Aubry and Lewis 2003). Fishers in southern Oregon have been documented using a variety of habitats such as early seral open habitats, oak woodlands and previously harvested areas (pers. comm. Jeff VonKienast 2004). Fishers are restricted to two small, disjunct and genetically isolated populations in southwestern Oregon: an introduced population in the southern Cascades and an extant, historic population in the Siskiyou Mountains (Wisely et al. 2004, Aubry et al. 2004). The Siskiyou Mountain population is likely connected to a coastal population in northern California, because there are no human or habitat barriers to their genetic interchange (personal communication K. Aubry 2004). These personal communication references constitute the best available and most recent scientific information from leading experts conducting fisher studies concerning fisher presence in southern Oregon. Forest fragmentation remains a concern for fishers, as stated by Powell and Zielinski (1994):

> Presumably, fishers experience habitat loss when timber harvest removes overstory canopy from areas larger and more extensive than natural wind throw and fire would. Small patch cuts interspersed with large, connected, uncut areas should not seriously affect fisher populations. In fact, these small scale disturbances may increase the abundance and availability of some fisher prey.

Private timberlands may provide foraging and dispersal for fishers, but would not provide the large live trees, snags and logs necessary for natal and maternal den sites, and resting sites. Fisher would likely travel across private lands within their home range, because of the checkerboard ownership of BLM and private lands within the project area and watershed.

In the East Fork Illinois subwatershed, past harvest practices, and land ownership patterns are the main cause of fragmentation. BLM checkerboard ownership may be one of the primary factors limiting the ability of BLM lands to provide optimal habitat for fishers (USDA and USDI 1994b).

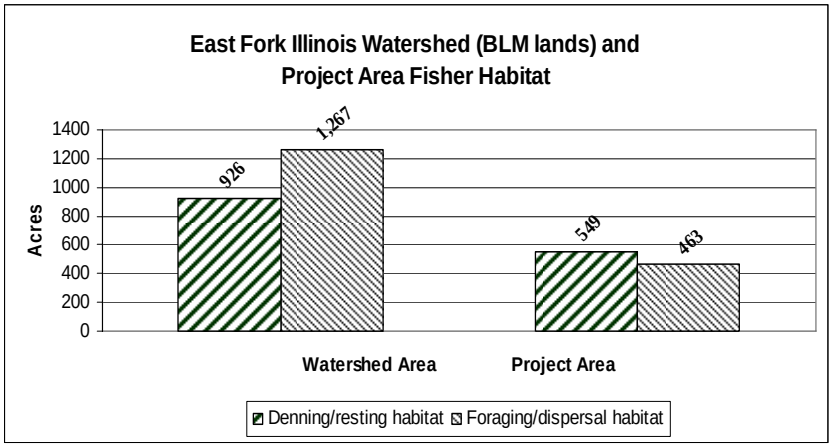
Forest carnivore surveys using bait stations with motion and infrared detection cameras have been conducted throughout the resource area and have detected fishers in the vicinity of

Williams and near the top of the Deer Creek drainage. Additionally, BLM has documented observations near Galice Creek. Fishers may occur in the upper reaches of the EF Illinois watershed, but are unlikely in the project area because of the natural fragmentation of the forest and urban development. BLM checkerboard ownership may be one of the primary factors limiting the ability of BLM lands to provide optimal habitat for fishers (USDA and USDI 1994b).

Fishers are naturally rare and have a disjunct distribution in the Pacific Northwest. Appendix J-2 of the NWFP determined that their range included 34% non-federal land and that although federal lands may provide suitable well-distributed habitat, fisher populations may never become well distributed due partly to limited federal land ownership at lower elevations and the species' naturally low abundance. The NWFP concluded that "habitat is of sufficient quality, distribution, and abundance to allow the species population to stabilize. However, significant gaps in the historic species distribution on federal lands may cause some range-wide limitation in interactions, and thus loss of genetic exchange among populations (USDA and USDI 1994b). The Pacific fisher has been extirpated from extensive regions of its historical range in the Pacific states (Powell and Zielinski 1994). Buskirk and Powell (1994) concluded that fishers are one of the most habitat specialized mammal species in North America; however, views differ about the fisher's need for extensive tracts of mature, largely coniferous, forest stands. Fishers in southern Oregon have been documented using a variety of habitats such as young successional open habitats, oak woodlands and previously harvested areas (personal communication, Jeff VonKienast 2004). Fishers are wide-ranging animals (Zielinski et al. 2004) with movements recorded from radio-tracked animals of up to 26 km for females and 55 km for males (Aubry and Raley 2002). Males have been documented to have a larger home range (~147 $km^2$) during the breeding season compared to ~63 $km^2$ during the non-breeding season (Aubry and Raley 2002). Given that fishers are capable of moving long distances, the entire East Fork Illinois project area and watershed can be considered fisher habitat; however, certain inferences can be made on suitability of habitat for natal dens, resting and foraging.

The McKelvey rating system adequately describes habitat structures and canopy closures important to fishers for natal dens and is used for assessing impacts. There are approximately 549 acres of denning and resting habitat, and 463 acres of foraging habitat for fishers in the project area and 926 and 1,267 acres, respectively, in the subwatershed (Figure 5).

**Figure 5. Fisher Habitat in the Watershed and Project Area**



**Alternative 1 - No Action**

Effects for the no action alternative were described above for the spotted owl and are relevant in their entirety for effects to the fisher due to similar habitat conditions and requirements (Powell & Zielinski 1994, Aubry & Raley 2002, Buskirk & Powell 1994). The greatest risk of no action is wildfire loss of large remnant conifers and hardwoods important to fisher natal and maternal denning sites.

**Alternatives 2, 3 and 4**

**Fisher Habitat**

Effects for alternatives 2, 3 and 4 for the spotted owl were described above and are relevant in their entirety for effects to the fisher, because habitat structure and condition, as well as prey species use are similar (Powell & Zielinski, 1994; Aubry & Raley, 2002; Buskirk & Powell, 1994). However, they may use impacted habitats for foraging if coarse woody debris is available for prey species and some cover is retained.

Alternative 2 proposes to decrease denning/resting habitat by 285 acres (31% and 52% in the watershed and project area respectively) and increase foraging habitat by 148 acres (12% and 32% in the watershed and project area respectively). Alternatives 3 and 4 propose to decrease denning/resting habitat by two acres and five acres respectively (<1% on both watershed and project area scales) (Figure 6).

Restoration thinning would convert current foraging/dispersal habitat to nonhabitat on 148 acres (alternative 2), 76 acres (alternative 3) and 54 acres (alternative 4). (12%, 6% and 4% respectively on the watershed scale and 27%, 16% and 12% in the project area) (Figures 6 and 7). However, fishers were found to use recovering regeneration units for foraging on the Rogue River National Forest (Aubry and Raley 2002; Aubry and Lewis 2003) and therefore, fishers would likely continue to use these areas for foraging. Fisher prey species included ground squirrels, rabbits, skunks and birds in these old clearcuts. This study also found that fishers ate berries and yellow jackets. Fishers apparently used recovering clearcuts for foraging, rather than resting and denning. Overall, effects of alternative 2 would decrease closed canopy denning/resting habitat, but would retain large trees and snags with cavities to provide for these needs. While fishers may shift activities to other areas during treatment, habitat in the watershed and project area would continue to provide for fisher resource needs. Alternatives 3 and 4 would only minimally affect resources needed by fishers for denning and resting.

**Figure 6. Fisher Habitat Harvest Effects in the Project Area for Alternatives 2, 3 and 4**

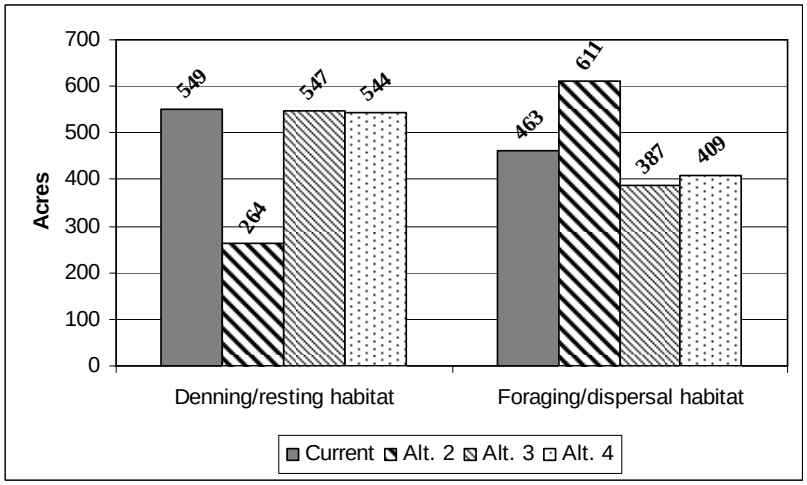
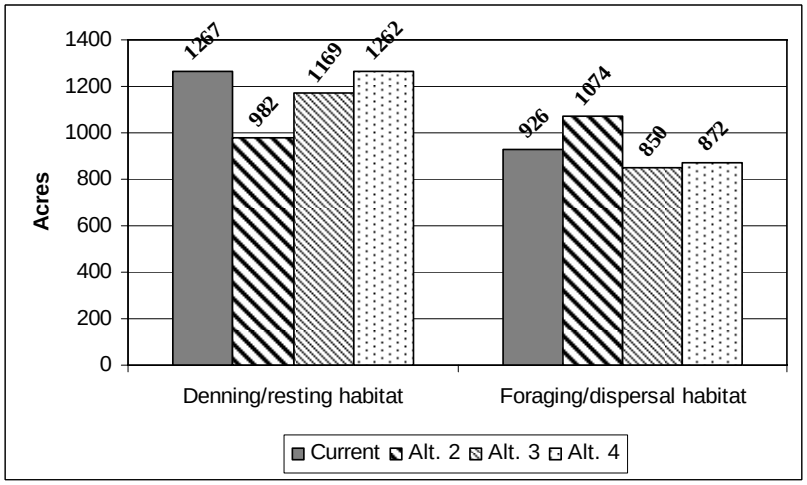



**Figure 7. Fisher Habitat Harvest Effects in the Watershed for Alternatives 2, 3 and 4**




A study in northern California found fishers to be associated with riparian reserves and residual forest structures where large hardwoods and live trees were left in patches in managed landscapes (pers. comm. L. Diller 2004). Retaining legacies would provide habitat structure for natal and maternal denning sites, resting sites and structure important to fisher prey species as these stands develop through successional pathways.

Variable density thinning in stands in which 40% canopy closure would be maintained (approximately 578 acres for alternative 2) would likely result in lower squirrel abundance because of reduced truffle production and arboreal travel ways (Colgan et al. 1999). Additionally, these treatments would result in lower abundance of other small mammals such as snowshoe hare, brush rabbit, white-footed mice, deer mice, red-backed voles, and meadow voles, because of the reduction of habitat from the removal of understory and overstory vegetation. However, other potential prey species' populations such as woodrats may increase due to the more open canopy (see spotted owl prey species discussion above). In one study, fishers were found to avoid forested stands with less than 40% canopy cover (Aubry and Lewis 2003), likely due to the reduce abundance of prey species. However, as described previously, fishers have been known to forage in these types of forested stands in Southwest Oregon. Effects to prey

species are relatively short term as overstory canopy closes to 60% in 10-15 years and understories revegetate within 5 years. Variable density thinning with a treatment prescription of maintaining overstory canopy closures (alternative 3) or retaining 60% canopy (alternative 4) would minimally affect fisher prey species and their habitat. While some short term reduction in prey species would be expected, there would be adequate prey available to provide for fisher's needs because untreated habitat would continue to provide prey, and treated areas may enhance prey diversity. The effects of uneven-aged timber management practices, such as are proposed for this project, have not been specifically studied, but are likely to have less effect on fisher habitat than even-aged management (Powell and Zielinski 1994), as higher vegetation density is correlated with higher animal species diversity.

Additionally, late-successional habitat would be provided in the project area and 5th field watershed because of no treatment areas, riparian reserves, RTV buffers, and 15% late-successional forest retention (RMP pp. 38-40).

Impacts associated with timber sale operation noise disturbance are unknown due to a lack of scientific literature. There is evidence that fishers avoid roaded areas (Harris and Ogan 1997), and the fisher has been characterized as a species that avoids humans (Douglas and Strickland 1987, Powell 1993). Alternatives 2, 3 and 4 would construct 0.89 miles of temporary road, and would decommission 1.25 miles of road. Disturbance from timber sale operations would be temporally and geographically limited and would occupy a geographic area smaller than the average fisher home range. Fishers have large home ranges and would be able to move away from the area where disturbance is occurring. Additionally, seasonal restrictions would preclude activities during natal season and juvenile rearing, thereby minimizing disturbance during this time.

In summary, all action alternatives would degrade fisher habitat through mechanical thinning, and noise disturbance from vegetation treatments that would result in reducing prey species and use of these habitats by fisher in the short term. Alternative 3 would have the least impact followed by alternative 4; alternative 2 would have the greatest effect through downgrading of habitat from denning/resting to foraging/dispersal.

However, the action alternatives would not contribute to the need to federally list the fisher. While some habitat would be degraded, it would still remain suitable for fisher dispersal and foraging; fishers are wide-ranging species and thus are able to move to minimize disturbance, seasonal restrictions for soils would restrict activities until young are approximately eight to ten weeks of age, and habitat features such as large snags and coarse downed wood would be maintained across the project area.

***Red Tree Vole***

**Affected Environment**

The red tree vole (RTV) is the most arboreal mammal in the Pacific Northwest (Carey 1996). Habitat is primarily mesic Douglas-fir forest. They have small home ranges, low dispersal capability, low reproductive potential and are sensitive to stand level disturbances (USDA, USDI 2002). Major threats to the species include loss of occupied sites where these sites may be important to persistence of vole populations and increased isolation of remaining populations. Although the RTV may occur in younger stands, old growth forests seem to provide optimum habitat. Nests are built on suitable foundations such as large tree limbs, whorls, and the nests of

birds or squirrels. They feed mostly on fir needles, bark, and lichens (Verts and Carraway 1998). RTVs are an important prey species for spotted owls.

RTV surveys were complete in September 2001. Due to the age of some surveys, some areas will be resurveyed before a decision is rendered on this project. (Ground surveys have been completed and climbing of identified trees will be completed prior to a decision on this project.) During initial surveys, of the approximately 484 trees climbed, 31 active, occupied nests and 33 inactive nests (13%) were found in the project area. Population numbers are unknown. Buffers will be implemented on all active nest sites as per management recommendations (USDA, USDI, 2000) prior to any project activities. Active sites include at least one active nest and all active and inactive nests within 100m of any nest within the site. All active nests are protected by a minimum 10 acre buffer. RTV buffers to date are estimated to remove approximately 237 acres from proposed harvest; additional acreage will be removed from harvest dependent on climbing results.

**Alternative 1 - No Action**
Effects from the no action alternative as described above for the spotted owl are relevant in their entirety for the RTV because their habitats are similar. Successional stand development would continue to be influenced by fire suppression, high stem densities and ladder fuels. The risk of stand replacing fire would continue to be a threat, which would impact RTV habitat if a large, severe fire occurred. Development of late-successional habitat in the project area would be delayed by no action because stand development patterns have changed due to fire suppression efforts. In summary, forested stands in the project area would continue to develop towards older forest conditions through natural succession, although at a lower rate than if low/moderate severity fire had continued to be a part of natural conditions.

**Alternatives 2, 3 & 4**
Effects for alternatives 2, 3 and 4 for the spotted owl were described above and are relevant in their entirety as they relate to spotted owl prey specie, such as the RTV (Carey 1996; Carey 2004; Courtney et al. 2004; Forsman et al. 2004).

RTV nest trees would not be cut and a minimum 10 acre buffer would delineated for all active nest sites (USDA, USDI 2000). This should provide protection for RTVs throughout the project area, provide for dispersal and migration, and allow for species persistence.

In the long term, effects for all action alternatives include an increase in mature and late-successional habitats in the project area with high canopy closures that may facilitate more successful dispersal of the species. Additionally, the proposed pre-commercial thinning and brushing throughout the project area would accelerate the development of potential RTV habitat. Alternative 2 would reduce canopy in more suitable habitat than alternatives 3 and 4, thus having a potentially greater impact on nests that were not located during surveys. However, as buffers are large, encompassing RTV dispersal distance (USDA, USDI 2000), and the majority of suitable habitat (Survey protocol, Version 2.1, USDA, USDI 2002), it is expected that RTVs would maintain viable populations in the project area and watershed.

***Connectivity***

**Affected Environment**
McKelvey ratings were used to assess connectivity across late-successional habitat in the project area. Units with McKelvey ratings 1 or 2 (spotted owl nesting, roosting and foraging habitat)

were identified as providing habitat structure that could facilitate connectivity. The low elevation late-successional forests in the project area provide habitat for migration and dispersal for wildlife, as well as for foraging, resting, nesting and protection from weather extremes and predation. Loss of connectivity could result in reduced survival and reproductive success, and reduced genetic exchange among subpopulations, particularly for species with short dispersal distances. Effects to connectivity would be similar to effects to spotted owl habitat because habitat structure and condition required for dispersal and migration are similar. Connectivity would be negatively affected if canopy closure is reduced to less than 60%. Prescriptions under alternatives 3 and 4 are designed to provide canopy closure as well as coarse wood and other habitat characteristics necessary to provide for dispersal and migration of late-successional dependent species. Using McKelvey ratings 1 and 2, the project area and watershed currently provide approximately 549 acres and 926 acres, respectively of late successional habitat connectivity.

**Alternative 1 - No Action**
Successional development of stands would continue to be influenced by fire suppression resulting in high stem densities and ladder fuels. The risk of a stand replacement fire event would continue to be a threat to habitat connectivity. Development of late-successional habitats in the project area would be delayed by no action because stand development patterns have changed due to fire suppression efforts. Encroachment of conifers and increased density of shrublands would continue, reducing structural heterogeneity of serpentine influenced habitats. This would negatively impact mammal and bird species which depend on structural diversity including shrub thickets for nesting and roosting, and open spaces or edge habitat for foraging. Dispersal may also be negatively affected by conifer or shrub encroachment. In summary, forested stands in the project area would continue to develop towards older forest conditions through natural succession, although at a lower rate than if fire had continued to be a part of natural conditions. Additionally, open serpentine influenced vegetation communities would continue to diminish because of encroachment.

**Alternatives 2, 3 & 4**
Timber harvest would have the greatest effect on connectivity. Alternative 2 would reduce habitat for connectivity by up to 285 acres (52%); however, this is expected to be less with additional red tree vole buffers discovered in the recent survey effort. This would occur across the project area and some habitat connectivity would be maintained through riparian reserves, red tree vole buffers and untreated areas. Alternatives 3 and 4 would have minimal short-term effects on connectivity because of the canopy retention requirements. Alternative 3 would have the least effect on connectivity because it retains existing canopy and does not modify overstory structure.

Units proposed for wildlife habitat restoration and enhancement and associated fuel hazard reduction treatments in all alternatives contribute minimally to connectivity because of low canopy closure in these areas; therefore these activities would not negatively affect connectivity. Density management/understory reduction, as proposed under alternative 3 would not modify the overstory structure and canopy closure, and thus would not impact the function of the stands to provide for connectivity. This is because the higher canopy density would be maintained, thus maintaining arboreal travel ways. Density management under alternative 2, in units with a target canopy closure of 40% would reduce the function of the stand and no longer provide habitat structure for connectivity in the short term (10-15 years), by disrupting arboreal travel ways. However, this type of treatment would accelerate the stand development which, in the long term, would again function and provide habitat important to connectivity.

In the project area, there may be some short term effects on connectivity for species that disperse for short distances (red tree voles, molluscs and salamanders) because some treatments may inhibit dispersal between closed canopy forests. However, as vegetation between closed canopy forests was historically more open because of edaphic factors (lowland oak woodlands, serpentine soils, rocky areas), post-harvest conditions would exhibit an environment closer to the historic range of habitat connectivity. Connectivity would continue to function for RTVs and other species with similar dispersal capabilities because of site buffers and riparian areas adequate to provide for genetic exchange and dispersal between populations. On the larger scale, an analysis of dispersal habitat and connectivity for the entire Rogue River Basin was conducted for the spotted owl by USFWS. Even with wildfires and other federal and private timber harvest, ample dispersal habitat remains across the landscape to enable owl genetic interchange between LSRs (USDI 2003 (Biological Opinion log #1-15-03-F-511). This would also serve other long ranging species dispersal, migration and genetic exchange. Road construction could inhibit connectivity, and subsequently, dispersal and migration for some species such as salamanders which may view roads as barriers to movement (Rittenhouse and Semlitsch 2006).

In summary, although there may be some degradation of connectivity habitat, it would not affect reproductive success, dispersal, migration or genetic exchange among species populations because riparian reserves, RTV buffers and no treatment areas would continue to provide for connectivity across the landscape except where development or edaphic factors unrelated to the proposed actions influence vegetation composition. Additionally, these buffers would minimize the effects on both short range and long range dispersers. Alternative 2 would have the greatest effect because of canopy reduction, and alternative 3 would have minimal effects on canopy closure.

### *Dead Wood Dependent Species*

#### Affected Environment

A review of DecAid's snag association tables identified 47 wildlife species associated with down wood (down logs, branches, and root wads), 64 species associated with snags, and 29 species associated with tree cavities. Some species, such as Pileated Woodpeckers, were included in all three categories (Marcot et al. 2002).

Primary excavators create cavities used by other species (secondary cavity users). Primary excavators also transmit heart rot and other decay fungi, by probing and excavating, into trees; heart rot is important to other primary excavators not able to excavate sound wood (Aubry and Raley, 2002). The following special status species are either primary cavity excavators or secondary cavity nesters, suspected to occur in the project area and the East Fork Illinois River watershed: Lewis's Woodpecker, Flammulated Owl, Pacific fisher, fringed myotis, Pacific pallid bat, and the Townsend's big-eared bat. Townsend's big-eared bat is generally considered a cave user, but is known to use trees for roosting.

Fishers use live tree and snag cavities (many of which are excavated by Pileated Woodpeckers) as well as down logs in southern Oregon (Aubry and Raley 2002, pers. comm. K. Aubry 2004). Bats use live tree and snag cavities as well as rock crevices, mines, caves, stumps, loose bark, bridges, buildings, and other protected sites (Verts and Carraway 1998). Four bat species (the silver-haired bat, long-eared myotis, long-legged myotis, and pallid bat are listed in the NWFP as protection buffer species (USDA and USDI 1994a,b). These bats are crevice dwellers and may use crevices under loose bark and in decaying stumps, or wedge into spaces in tree bark. Some

species may roost in cavities created by rot or excavated by woodpeckers. Pallid bats also roost in rock crevices, tree hollows, mines, caves and a variety of anthropogenic structures, including vacant and occupied buildings (Sherwin 1998). Townsend's big-eared bats hibernate in caves and mines during winter (Sherwin 1998). The fringed myotis is a crevice dweller found in crevices of mines, caves, rocks, and large conifers (Bradley et al. 1998). No bat roosting sites are known within the project area; however Townsend's big-eared bats and pallid bats have been detected within the East Fork Illinois watershed, and the fringed myotis is known to occur in the Grants Pass Resource Area.

There are no known caves or abandoned mines, wooden bridges or buildings in the project area that would warrant management as an occupied bat site. Older forest stands receive greater use by bats due to the availability of roosts, a complex vertical structure and less clutter, providing room for flight and foraging. Studies show that older stands and thinned stands received more use by bats than unthinned stands, clearcuts and shelterwood cuts. Riparian habitats received the greatest use of all habitats (pers. comm. H. Ober 2006).

Some mammals that are important prey species for the spotted owl use down wood. Dusky-footed woodrats build stick nests, sometimes incorporating logs as part of the structure. They also may fortify hollow logs with sticks to use for dens. Other prey species, such as the western red-backed vole use sound logs for travel lanes and rotting logs for foraging, nesting, or internal travel routes. Moisture in and under rotting logs provides fungi habitat, which is the main food for northern flying squirrel and the western red-backed vole.

**Alternative 1 - No Action**

Effects of the no action alternative were described above for the fisher and are relevant in their entirety for effects to bats and other cavity users due to similar habitats (Weller and Zabel 2001). Additional effects to bats include restrictions on access to snags in dense stands due to cluttered flight paths (clutter results in echolocation interference) (pers. comm. J. Hayes 2003).

**Alternatives 2, 3 and 4**

The greatest concern for dead wood dependent species is retention of adequate roosting and foraging, and large snags with cavities for nesting. The greatest concern for bat habitat is the retention of undisturbed roosting sites in snags, caves, mines, bridges, abandoned buildings or other potential roost sites during critical seasons for bats (maternity and hibernation). PDFs would ensure adequate snag retention and down wood recruitment by retaining all snags >16" dbh (PDF section 2.4.4; RMP p. 44) unless cut as a hazard tree, and left on site for down wood. Down wood would be retained where it is currently available to meet or exceed minimum requirements of the RMP (p. 45) of 120 lineal feet per acre (>16" dbh and 16' long). Where snags are currently available, alternatives 2, 3 and 4 would meet or exceed these snag levels. Proposed thinning would reduce understory clutter and thus improve flyways for bats and other snag dependent species. Marking guidelines mitigate these potential negative effects by: 1) retaining all snags >16" dbh; 2) no trees with old growth characteristics are marked for harvest; and 3) the largest deformed or diseased trees are the preferred wildlife leave trees retained to meet dead wood targets (see draft Silvicultural Prescription, available as part of the project record, for a full description).

The NWFP identified snag and green tree retention guidelines that would reduce the risk of local extinctions and improve the likelihood that well-distributed populations of snag dependent species would be maintained (USDI and USDA 1994b). The CT/MGS prescription would maintain habitat structure and foraging substrates associated with snags and large conifers.

Retained snags and large conifer trees can be susceptible to wind throw, and the lack of canopy closure increases the risk of predation. Under alternatives 2, 3 and 4 snag levels would be maintained, minimizing effects on snag dependent species. Additionally, treatments would not affect caves, mines or anthropogenic structures, and therefore, bat populations and other dead wood dependent species would be minimally affected by project activities.

***Other Species of Concern***

The following species are not late-successional, cavity, or dead wood dependent. However, they may use components of late-successional habitat, such as large diameter trees.

***Bald Eagle***

**Affected Environment**

The Bald Eagle is listed as a Threatened species under the Endangered Species Act. USFWS proposed to remove the bald eagle from the list of endangered and threatened wildlife in 1999 (Federal Register July 6, 1999. Vol. 64(128) 36453-36464). No final determination has been made and the bald eagle remains a threatened species.

In southwest Oregon, the majority of Bald Eagle nests are in large trees near lakes, rivers, and ponds. Bald eagles likely feed on fish along the East Fork Illinois, and along the Illinois River, and forage in the open meadows in the lowlands along creeks in the watershed. Eagles build their nests in large dominant over story trees, often at the edge of a stand or on a ridge. Nest trees have broken or deformed tops and/or large branches to support the nest. There are no Bald Eagle nest sites in the project area or known in the watershed. If nest sites are located, they will be protected as per RMP guidelines (RMP p. 57).

**Alternative 1**

Effects for the no action alternative were described above for the spotted owl and are relevant in their entirety for the Bald Eagle, because the consequences of no action to Bald Eagle nesting habitat structure and condition are similar (Isaacs et al. 2003; Anthony et al. 1989; Anthony et al. 1982). Ultimately, the greatest risk is in the loss of large diameter remnant conifers important to Bald Eagle nesting, roosting and perching. Alternative 1 could potentially increase risk to Bald Eagle roost trees because of continued increased fire hazard.

**Alternatives 2, 3 and 4**

As there are no Bald Eagles in the project area there are no adverse anticipated effects to the species from project activities. Variable density thinning under all alternatives could potentially increase the rate of development of large nest or roost trees and increase habitat suitability in the long term. Alternative 2 may result in the harvest of some potential roost/nest trees, but includes more thinning than alternatives 3 and 4, and would accelerate development of large trees to the greatest extent.

Alternative 3 would not modify the overstory structure of the stands and no potential nesting/roosting trees would be cut. Therefore, effects would be similar to those under the No Action alternative.

In alternative 4, commercial treatments would modify the overstory structure, but would maintain a 60% canopy closure from the largest green conifer trees. Commercial and fuel hazard reduction treatments would open the understory through the removal of brush and small trees and

may increase the rate of development of large trees suitable for eagle nesting and roosting because of reduced competition.

In summary, the effect of alternatives 2, 3 & 4 to Bald Eagles and their habitat would result in no change to existing roosting, nesting, foraging or perching trees. However, alternatives 2 and 4 may increase the rate of development of roosting and nesting structure.

***Peregrine Falcon***

The peregrine falcon had been a federally listed Threatened species, but was removed from the list in August 1999 (Federal Register August 25, 1999 Vol.64 (164) 46542-46558). At that time, the falcon was added to the BLM SSSP as a sensitive species.

Habitat for peregrine falcons is primarily tall cliffs (Henny and Pagel 2003). There are no suitable cliffs for nesting within the project area. The nearest confirmed active site is approximately 12 miles northeast of the project area. Forested lands provide habitat for prey species for falcons. Peregrines prey almost entirely on birds. As there is no suitable habitat for this species in the project area, there is no anticipated effect to this species from project activities. As the species is wide ranging and proposed actions would maintain diversity throughout the project area and watershed, activities would not affect prey availability.

***Land Birds (Neotropical migrants and year round residents)***

Land birds use a wide variety of habitats, including late-successional forests, riparian areas, brush in recovering clearcuts, and small trees in developing stands. Some birds, such as the Olive-sided Flycatcher, perch on residual canopy trees and forage over clearcuts. Many land birds are associated with deciduous shrubs and trees in early successional habitats (i.e. Orange-crowned Warblers and Rufous Hummingbirds). Any action that changes or removes vegetation used by one species may benefit another. For example, understory thinning may negatively affect a species which uses dense understory, such as the Winter Wren, but would benefit other species, such as Hammond's Flycatcher, which forage in open mid-stories.

Neotropical migrants migrate to Central or South America each year. Neotropical birds, as a group, are not special status species. They are addressed here due to widespread concern regarding downward population trends, habitat declines, and the BLM's efforts to comply with Executive Order 13186, the Migratory Bird Treaty Act (per a MOU between the BLM, U.S. Forest Service and the U.S. Fish and Wildlife Service). None of the neotropical migrants documented as occurring on the Medford District BLM are listed as endangered or threatened. In February 2003, USFWS identified migratory non-game birds that were species of conservation concern (Federal Register July 10, 2003 Vol. 68, No. 25, 6179). Six birds on this list (Table 15) are known to occur on the Medford District BLM (USDI USFWS 2002).

**Table 15. Birds of Conservation Concern for Medford District BLM**

| Species | Presence in the Watershed |
|---|---|
| Peregrine Falcon | Present (foraging only; not nesting) |
| Flammulated Owl | Unknown |
| Olive-sided flycatcher | Present |
| Rufous Hummingbird | Present |
| Lewis' woodpecker | Unknown |
| White-headed woodpecker | Unknown |

Resident birds remain in the same general area (e.g., the Pileated Woodpecker) or migrate to lower elevations in the winter (e.g., the Dark-eyed Junco). Populations of late-successional dependent migratory or resident birds for the East Fork Illinois watershed are unknown. Breeding bird surveys indicate increasing evidence that regionally, songbirds are declining (Sauer et al. 2005, personal communication J. Alexander 2005). However, the cause of these declines is still unclear, but is suspected to be related to their winter grounds.

**Alternative 1 - No Action**

Effects for the no action alternative were described above for the spotted owl and are relevant in their entirety as they relate to late-successional structure and conditions for land birds. Meadows, shrub habitats and oak woodlands would continue to be encroached upon by small trees and shrubs. Development and maintenance of forest and non-forest habitats have stagnated because of lack of fire or other disturbance; this trend would continue. Some bird species have benefited from the lack of fire while others have declined due to habitat changes outside the historic range of variability. Ultimately, the greatest risk is the loss of large diameter remnant conifers and hardwoods important to land birds from encroachment or severe wildfire. Alternative 1 would not enhance the development of large diameter conifers. Over time, these habitat structures would be lost without future recruitment (Sensenig 2002).

**Alternatives 2, 3 and 4**

Alternatives 2, 3 and 4 would treat a variety of songbird habitats, causing a shift in habitat use, decrease available habitat for some species and increase habitat for others. Birds such as Brown Creepers that use mature and old growth trees would have reduced amounts of late-successional forest available because of habitat removal and reduced canopy closure in alternative 2 and 4. Alternative 3 would minimally affect existing habitat because existing canopy would be retained, and alternative 4 would retain 60% canopy closure, minimizing the effect on these species. However, species such as the Rufous Hummingbird which use nectar producing plants would benefit from the increase in forbs and flowering shrubs which would occur post treatment under alternative 2. This increase would continue until the tree canopy recovers and shades out these plants.

Short term effects to meadows, shrub habitats, and oak woodlands would include reduced stem densities, shrub abundance and structure. The same treatments would potentially enhance habitat for forbs and flowering shrubs. These changes could reduce the occurrence of species that have benefited from fire suppression such as the Nashville Warbler (personal communication J. Alexander 2005) and increase the availability of foraging habitat for species such as the Rufous Hummingbird. Long term effects would include increased native grass abundance and the maintenance and enhancement of meadows, oak woodlands and Jeffrey pine savannahs. Species that would benefit long term from these treatments include the Flammulated Owl, Western Bluebird, and prey species such as small mammals and a host of insects associated with these habitats. Alternative 2 proposes to treat more acres of Jeffrey pine savannah than alternatives 3 or 4. Therefore, over time, alternative 2 would benefit more species associated with this unique plant community than alternative 3.

Short term effects to forested stands for all action alternatives include reduced stem densities, ladder fuels and canopy closure. Treatments would retain large structure and large diameter snags and down wood. Species that benefited from lack of fire and dense understories could be adversely affected by these treatments. Songbird composition and abundance in treated stands could be reduced in the short term (Janes 2003; Hagar and Howlin 2001; Hagar et al. 1996). However, it is likely that by moving stands toward their historic range of variability, some

species that have been adversely affected by fire suppression would benefit. Long term effects include accelerated development of large tree structure for interior forest species. Alternatives 2, 3 and 4 propose activities that would contribute to moving stands in the project area towards their historic range of variability benefiting those species historically present. Alternative 2 proposes activities that could benefit these species more than alternatives 3 and 4, and therefore would move a greater percentage of the project area toward this historic range of variability.

Under all alternatives, extensive areas of vegetation would remain untreated and would provide adequate nesting, roosting, foraging and dispersal habitat for all songbirds throughout the project area. However, disturbance and direct impacts on or near nests could reduce reproductive success of nesting birds if activities occur during the nesting season. This would only occur during the season of activity and would not extend beyond activity areas.

In summary, each action alternative would modify habitat to varying degrees shifting habitat suitability among land birds. While there would be a shift in species composition, as adequate habitat for these species occurs in the project area and the watershed, the alternatives would not result in or contribute to the need for federal listing.

### *Big Game*

#### Affected Environment

Deer, elk, bear and cougar are not late-successional dependent species. They depend upon early seral vegetation for forage and need dense vegetation for hiding cover for fawning and calving and to escape predators. The project area provides year round habitat for these species. The Medford District RMP designated big game winter range and the entire project area is considered deer or elk winter range (Map 8).

Since the late 1970s, the belief that thermal cover constitutes a key component of ungulate habitat has resulted in its widespread application to the extent that virtually all elk habitat evaluation procedures currently use this variable as a measure of abundance in the Pacific Northwest (Wisdom et al. 1986; Thomas et al. 1988) and many other regions in the western United States (Christensen et al. 1993). These habitat evaluation procedures were used extensively in the development of national forest plans (Edge et al. 1987) and in the Medford RMP (p. 48; USDI BLM 1994, Vol. I, p. 3-39). Nonetheless, the concept of thermal cover remained a poorly tested hypothesis until Cook et al. (1998) concluded that thermal cover effects (summer and winter) on animal condition, had little relevance to herd productivity and demographics (Cook et al. 1998, Duncan 2000).

In contrast, the effects of nutrition on population demography of free-ranging ungulates have been reasonably well established (Clutton-Brock et al. 1982, Verme and Ullrey 1984, Coughenour and Singer 1996). In fact, there is a long recognized inverse relationship between forage production and forest canopy closure (Pase 1958, Young et al. 1967, McConnell and Smith 1970), such that emphasis on thermal cover over food production can reduce forage production and, in turn, carrying capacity. The quality and quantity of forage directly relates to physical condition of deer, elk, bear and cougar.

#### Alternative 1

Effects of the no action alternative on big game would be two fold. First, there would be no creation of early successional habitat or rejuvenation of decadent foraging habitat through mechanical or prescribed fire which these species require for browse. Historic fire regimes prior

to fire suppression provided for these open habitats and succulent browse important to the nutritional needs of does and cows. Second, alternative 1 would sustain the current fuel hazard condition of the project area. A wildfire in these conditions would reduce the available cover for security and fawning and calving habitat.

**Alternatives 2, 3 and 4**
Harvest in alternatives 2 and 4 would reduce canopy closures and increase available forage for deer and elk, and potentially for bear through increase in forbs and shrubs. Harvest and fuel hazard reduction treatments would open the understory, providing for easier access and increased forage availability, but would reduce security cover. ODFW recommends road density reduction and habitat improvement projects, such as prescribed burns on south slope aspects, to maintain or improve big game habitat. Alternatives 2, 3 and 4 would reduce road density through the decommissioning of 1.25 miles of road. Alternatives 2, 3 and 4 would likely benefit deer, elk and bear primarily through the increase in available forage.

***Invertebrates***

**Affected Environment**
There are two Bureau Sensitive/S&M snail species: the Oregon shoulderband (*Helminthoglypta hertleini*) and the travelling sideband (*Monadenia fidelis celeuthia*). This group generally requires closed canopy, cool, moist environments with the exception of the Oregon shoulderband which may utilize rocky talus in open exposed slopes. Oregon shoulderbands were found in rocky areas associated with damp grassy areas, oak woodlands, and shrub lands, or in conifer forests closely associated with these habitat types. Shoulderband survey data analysis determined that they were not late-successional or old growth habitat dependent (USDA & USDI 2003a).

Since the late 1990s, more than 15 landscape management project areas throughout the Grants Pass Resource Area have been surveyed for these two species using the terrestrial mollusk survey protocol (USDA and USDI 1997, USDA and USDI 2002b, USDA and USDI 2003a, b). Unknown molluscs were collected and submitted to taxa experts for identification; however, none of the *Monadenia* species were identified as the travelling sideband. Surveys on the Grants Pass Resource Area have revealed no detections for the sideband and only three detections for the shoulderband east and north of the project area. The entire project area was surveyed for S&M molluscs. None were located. If S&M molluscs are located during project activities, approved management recommendations would be implemented.

**Alternative 1 - No Action**
The forest would continue to go through successional development towards older forest conditions, which would be favorable to late-successional forest associated molluscs. Foraging opportunities for species associated with shade intolerant hardwoods would diminish. The potential for a fire in the project area would remain high.

**Alternative 2, 3 and 4**
Unidentified occupied habitat or for non-S&M species could experience short term effects, including warmer, drier conditions which could reduce mollusc use of those areas; however, as no S&M species were located during surveys, there are no anticipated effects to these species. This effect could extend into unknown sites because of the edge effect, but would be minimized because of the retention of at least 40% canopy cover in treated units. These effects could be expected to mimic what would have occurred under normal disturbance regimes prior to the fire

suppression era. Long term effects would be a reduced risk of stand replacing fire, which would likely maintain high canopy closures and mollusc populations. Alternative 2 proposes to treat more areas of habitat than alternatives 3 or 4, which would provide a greater long term benefit to the species through the reduced risk of severe fire.

### *Amphibians*

**Affected Environment**

Habitat (rock, talus and coarse wood) for amphibians, including the Del Norte salamander, is sporadically distributed throughout the project area, occurring primarily near rock outcrops, ridge tops, and along riparian areas. Protocol surveys have been partially completed for Del Norte salamanders and one site was located. Surveys are no longer required for this species, and are not planned. The Del Norte salamander is currently a Bureau Tracking species and is not considered a management species under the SSSP. Additionally, under the S&M program, predisturbance surveys are no longer required (S&M ROD 2001). A variety of amphibians likely occur in the project area including riparian and upland species.

**Alternative 1 - No Action**

The amount of amphibian habitat would remain at its current level. Forested vegetation on talus would remain at risk from wildfire. Suitable talus habitat can exist in late-successional forest stands, and high canopy closures can be attained from overstory trees to maintain a cool, moist microclimate important to salamanders. Fuel loading and ladder fuel conditions make amphibian habitat susceptible to risk of high severity fire which would reduce canopy closure over talus habitat randomly across the landscape, retarding succession and development of shade tolerant trees.

**Alternatives 2, 3 and 4**

All action alternatives propose treatments in talus and other amphibian habitat such as where down logs occur. Canopy closures in most units would be retained at or above 40% in alternative 2 and 60% or higher in alternatives 3 and 4. A minimum 40% canopy closure is recommended for Del Norte habitat (RMP p. 47) and would likely provide at least marginal microclimatic conditions for amphibians. Riparian reserves and other untreated areas would provide refugia for amphibian species. Short term effects would include warmer, drier conditions in some habitat areas which could reduce salamander use of those areas. Coarse down wood would be retained and continue to provide the microclimate that these structures afford. However, these effects are expected to mimic what would have occurred under normal disturbance regimes prior to the fire suppression era. Long term effects would be reduced risk of stand replacing fire, which would likely maintain high canopy closures and amphibian populations. Alternative 2 would treat more acres than alternatives 3 and 4, which would have a greater long term benefit to species through the reduced risk of severe fire.

**Effects of Roads**

For all alternatives, road construction could cause warmer, drier conditions in adjacent interior forest habitats because of reduction of the canopy closure and increase solar and wind exposure (Trombulak and Frissell 2000). This could result in reduced reproduction and survival of species with low dispersal capabilities such as mollusks and possibly amphibians (Marsh and Beckman 2004). However, road construction will occur in a small portion of the project area and in relatively dry sites which are not prime habitat for these species. Species with greater dispersal capabilities could likely move to areas with more favorable microclimate conditions if suitable habitat were nearby. If suitable habitat was not within dispersal distance, these species could

also experience reduced reproduction and survival. Both temporary and permanent road construction would be expected to decrease habitat from edge effects (Trombulak and Frissell 2000) and preclude dispersal of these short dispersal distance species through habitat fragmentation. On a project scale, effects to these species would be minimal because of the small amount of road construction, and project activities would not be expected to substantially affect these species.

**Cumulative Effects**

Cumulative effects in the project area result from the incremental impact of the alternatives, added to other past, present and reasonably foreseeable future actions. Fire suppression, mining, road building, grazing, land development, agriculture and timber harvest throughout the watershed have altered historic conditions. Species associated with younger forested conditions have benefited from these changes. Species associated with late-successional forests, such as the spotted owl, have declined historically, but have been relatively stable for the last 10 years (USFWS 2004). However, as habitats in the East Fork Illinois watershed are naturally fragmented because of oak and other hardwood stands and edaphic conditions, the impact on these species is likely less than in more contiguous late-successional habitats because of adaptation to local, fragmented conditions. Land development and agriculture have reduced low elevation habitats, creating barriers and prohibiting dispersal of some species. Overall, these past activities have resulted in a loss of habitat. The majority of remaining older forest occurs on public lands managed by the BLM and the Forest Service.

These past activities have changed the distribution and abundance of habitats and many wildlife species. For example, riparian habitats have been altered by road construction, development, and mining, changing the hydrology and vegetation potential from historic conditions, which has affected the quality of connective habitat these areas provide. Mature and old growth forests have decreased from approximately 21,000 acres to 14,000 acres (USDAFS 2000) compared to reference conditions.

Timber harvest has occurred and would continue to occur on private lands in the East Fork Illinois watershed. Rotational harvest of privately owned timberland in the watershed is expected to continue at current levels at an estimated 60 year rotation; none are assumed to attain late-successional conditions. Late-successional habitat would likely rely on federal lands for its persistence.

As a result of the NWFP, there has been a shift in management on federal lands in the Rogue Basin. Prior to the plan, harvest treatments were dominated by regeneration harvest. In the East Fork Illinois watershed, harvest treatments shifted to density management as a result of the NWFP. This has resulted in the treatment of many more acres compared to regeneration harvest of equivalent timber volume. Density management has fewer adverse effects on wildlife than regeneration harvest. Additionally, due to the National Fire Plan (NFP), management activities have been designed to move vegetation towards its historic range of variability by reducing fuel levels. The NWFP and NFP have resulted in treatments more in line with historic disturbance regimes.

Range-wide, Northern Spotted Owl populations declined 3.7% annually from 1985-2003 (USFWS 2004). In the Tyee, Klamath, and South Cascades study areas in southwestern Oregon, spotted owl populations appeared stable from 1985-2003 (USFWS 2004). Habitat loss due to timber harvest was identified as the paramount threat in 1990 (USFWS 2004). The NWFP and RMP anticipated a loss of habitat due to timber harvest (USDA/USDI 1994 Vol. 1; RMP).

However this loss has been less than anticipated and the rate of suitable habitat loss due to timber harvest on private, state, and federal forest lands declined in the late 1980s and early 1990s (USFWS 2004). The harvest rates in suitable habitat on BLM lands in Oregon was 3% per year (22,000 acres) in 1990 and dropped to 0.52% per year (4,911 acres) by 2003 (USFWS 2004). During this period of declining rates of habitat loss, spotted owl populations in southwestern Oregon appeared stable. The future rate of habitat loss due to timber harvest on federal lands is expected to be less than 4% per decade (USDA, USDI, 2004 p.111). Since harvest rates on federal lands in Oregon are expected to remain low for the foreseeable future, it is reasonable to expect that NSO population would remain stable in southwestern Oregon. The harvest of up to 285 acres of suitable habitat the EF Illinois project is included in the projected BLM timber harvest program for southwestern Oregon. In addition, it is estimated that in the NWFP area, late-successional forest habitat development through in-growth (tree growth) is occurring at approximately 8% (600,000 acres) per decade over the baseline condition established in the NWFP (USFWS, 2004). This development is 2.5 times the rate of loss through stand replacement fire and harvest, and would result in a 2.7 million acre net increase in late-successional forest over 3-4 decades (USDA, USDI 2004). While much of this is only 80-100 years old, based on current trends, an improving trend in late-successional habitat conditions can be expected. Private forest lands and federal, non-reserved matrix lands are not expected to develop into suitable spotted owl habitat. Managed, mid-seral stands on federal, non-reserved matrix and on private lands produce spotted owl dispersal habitat that may be used to connect blocks of late seral habitat in the federal reserves.

At the province level, this project would not add cumulatively to effects on late-successional habitat. In 2002, the Biscuit Fire burned almost 500,000 acres, primarily on the Siskiyou National Forest. Although approximately 95,500 acres (45,000 acres in four LSRs) of spotted owl NRF habitat was lost, there are still approximately 69,168 acres of suitable habitat remaining in these LSRs (Biological Opinion, log #1-15-03-F-511). It is unknown to what extent burned sites would continue to be used by spotted owls. However, it has been determined that impacts from the Biscuit Fire would not be likely to preclude movement of spotted owls between the Coast and Cascades Provinces (BO, log #15-03-F-511, 2003).

The emergence of barred owls as invasive competitors, West Nile virus, and sudden oak death as new threats to spotted owls suggests an increase in risk to the species since 1990. These newly identified threats are poorly understood, are likely to be pervasive, and would be difficult to alleviate. However, this risk was not sufficient to change the status of the spotted owl (USFWS 2004).

While past forest management practices have fragmented habitat, there is no evidence that current forest practices immediately threaten any terrestrial vertebrate species in Oregon; current conservation measures appear adequate for species known to be vulnerable to forest practices (e.g., Northern Spotted Owl).

In summary, the rate of habitat loss is substantially reduced from historic trends, there is substantial in-growth and recovery of habitat, and newly identified threats are unconnected to the proposed action. Therefore, even with the additional downgrading of up to 280 acres, and removal of 5 acres of suitable nesting, roosting, foraging habitat, this project is unlikely to negatively affect the stability of the NSO populations in southwestern Oregon and is unlikely to substantially affect their demographics (USFWS 2003 log #1-15-03-F-511). This is particularly true given the status of no known active spotted owl sites in the project area. Additionally, as detailed above, the East Fork Illinois project would have relatively minor effects to species in the

watershed and would not extirpate any species from the project area or watershed. Cumulatively, while this project would further degrade late-successional habitat, this project combined with other actions in the watershed would not contribute to the need to federally list any Bureau sensitive or assessment wildlife species.

## 3.6 Fire and Fuels

### 3.6.1 Affected Environment

Fire regime, fire condition class, fuel models and estimates of fuel hazard provide indices of fuel loads, fire hazard, and difficulty of suppression. They allow comparison of the alternatives and assessment of the potential for the protection of homes and resources.

Wildfire History / Fire Regimes

The project area is in the Klamath Province Region in southwestern Oregon, where fire is recognized as a key natural disturbance (Atzet and Wheeler 1982). Fire has played an important role in influencing successional processes and creating diverse forest conditions.

Prior to the 20th century, low severity fires burned regularly in most dry forest ecosystems, with ignitions caused by lightning and humans. Low severity fire controlled regeneration of fire-intolerant species, promoted fire tolerant species, maintained an open forest structure, reduced forest biomass, decreased the impacts of insects and diseases, and maintained wildlife habitats for many species that utilize open stand structures (Graham et al. 2004). Native Americans influenced vegetation patterns for over a thousand years by igniting fires to enhance values that were important to their culture (Pullen 1995). Early settlers used fire to improve grazing and farming and to expose rock and soil for mining. Large, low to moderate severity fires were common in the area based on fire scars and vegetation patterns.

Fire regimes, referring to the frequency, severity and extent of fires occurring in an area (Agee 1991), are generally used with an historical perspective in the context of fire regimes prior to the era of fire exclusion. They also provide an indicator of natural processes that contributed to some of the current forest vegetation and structure. They are thus useful in characterizing broader conditions across a project area or the larger landscape. Agee (1993) described fire regime in southwest Oregon as moderate or mixed severity, that is, a mixture of stand replacement and low severity fires with fire return intervals ranging from 0-115 years. The East Fork Illinois project area includes fire regime 1 and 3:

*Fire Regime 1: 0-35 years, Low Severity.* Typical climax plant communities include ponderosa pine, Jeffery Pine, pine-oak woodlands, dry Douglas-fir sites and low elevation grasslands usually located in the valley bottoms. Large stand-replacing fire can occur under certain weather conditions, but are rare events (i.e. every 200 years). Valley bottoms, drier south and west aspects and the Jeffery Pine/ Oak savannah plant series in the project area fall within this regime (34% of project area).

*Fire Regime 3: < 50 years, mixed severity.* Typical plant communities include mixed conifer and dry westside Douglas-fir. Lower severity fire tends to predominate in many events. This regime usually results in heterogeneous landscapes. Large, stand-replacing fires may occur but are usually rare events. Wetter and cooler north and east aspects, riparian zones and the higher elevations within the project area fall within this fire regime (66% of project area).

Historic Fire Suppression

In the early 1900s, suppression of all fires became a major goal of land management agencies. This altered the historic fire regime. Based on calculations using fire return intervals, two to five fire cycles have been eliminated in the southwest Oregon mixed conifer forests that occur at low elevations (Agee 1996). As a result, fuel loading has increased and plant succession shifted to fire-prone vegetation. Species, such as ponderosa pine and oaks, have decreased. Many stands once open, are now heavily stocked with conifers and small oaks which have changed the horizontal and vertical stand structure. Surface and ladder fuels have increased, increasing the potential for large scale crown fires which were historically rare.

In the Douglas-fir series stand densities have increased and include more shade tolerant species (Atzet 1996). High stand densities result in weakened trees that are susceptible to insect epidemics and tree pathogens leading to an increase in hazardous fuels. High density forests burn with increased intensity because of the high fuel levels. High intensity fires can damage soils and often completely destroy riparian vegetation. Historically, low intensity fires often spared riparian areas, which reduced soil erosion and provided habitat diversity. The past 20 years in western forests indicate that there has been a trend toward more large fires which burn at higher intensities in vegetation types associated with low to mixed severity fire regimes (Agee and Skinner 2005).

Fire Regime Condition Classes (FRCC)

Fire regime condition classes offer another approach to evaluating potential fire conditions. It is an approach most useful at the watershed and larger scales with the effects of treatments being reflected in changes in the acreage in each FRCC (See Appendix D for descriptions). FRCCs are a function of the degree of departure from historical vegetation and disturbance regimes resulting in alterations of components such as species composition, structural stage, stand age, and canopy closure.

To evaluate FRCC in the project area, current conditions were compared to the historic condition classes using the *Landfire Rapid Assessment Reference Condition Models*. These models were devised by interagency ecologists and were peer reviewed. Each model includes comprehensive documentation that describes the vegetation, geography, biophysical characteristics, succession stages and disturbance regimes of each natural vegetation group and the reference characteristics of dominate vegetation and their disturbance regimes. Five reference condition class models were evaluated: Oregon White Oak, Oregon White Oak/Ponderosa Pine, Mixed Conifer-Southwest Oregon, Northern California Mixed Evergreen and Pine Savannah. While there are isolated areas on private and public lands that have had recent disturbance and are within their range of natural variability, the watershed as a whole classifies as a FRCC 3, having been significantly altered from its historical range.

Fire Behavior Fuel Models

The ten Fire Behavior Fuel Models are used to classify fire behavior in different fuels. Effects can be evaluated based on changes in fuel models which can affect landscape level fire behavior. See Appendix D for descriptions of fuel models.

Fire Risk, Fire Hazard, and Values at Risk

***Fire Risk*.** Fire risk reflects the probability of ignition within a given area. Lightning and humans have caused fires in the project area. Increased development of homes in the wildland urban interface, trail systems, dispersed camp sites, recreational use, and major travel corridors all

serve to increase the risk of human caused fires. Wildfires in the project area occur predominately from July through September.

Table 13 displays fire occurrences in the project area (all ownerships) over a 31 year period. Lightning accounted for 23% of the total fires; humans caused 77% of the total fires.

| Table 16. Historic Fire Occurrence (1970 – 2003) | |
|---|---|
| **Number of Fires** | **Size Class** |
| 71 | A (<.25ac) |
| 20 | B (.26-10ac) |
| 1 | C (10.1-100ac) |
| 0 | D (100.1-300ac) |
| 2 | F (> 300 ac) |

*Fire Hazard*. Fire hazard is useful in the broad prioritization of fuels management treatment needs in a project area. It also provides a comparative index for alternative proposals. Fire hazard provides an index of resistance to control a wildfire and is based on vegetation, fuel arrangement and volume, condition and location. All are determinants of the potential for spread of a fire and the difficulty of fire control.

Based on fire hazard, canopy base height, and canopy bulk density, the potential for a large fire to occur is high to extremely high for the project area. The extensive high hazard condition (Table 17) in the project area reflects the history of fire exclusion and fuel build up.

| Table 17. Fire Hazard Ratings | | | |
|---|---|---|---|
| **Fire Hazard Rating** | **BLM Lands (acres)** | **Non-BLM (acres)** | **Percentage of Each Category** |
| Low hazard | 37 | 167 | 4% |
| Moderate hazard | 326 | 1,409 | 32% |
| High hazard | 1,576 | 1,948 | 64% |

*Values at Risk* provide a relative index of resource and human values in an area. A majority of the project area is in the high and moderate values at risk category due to residential, wildlife, recreational, and other forest resource values. Approximately 71% of the project area is in the Illinois Valley designated Community at Risk (CAR); 29% is in the Wildland Urban Interface (WUI) (Table 18).

| Table 18. Wildland Urban Interface (WUI) and Communities at Risk (CAR) | | | | | | |
|---|---|---|---|---|---|---|
| **Designation** | **Acres** | **Percent of Project Area** | **BLM** | | **Private** | |
| | | | **Acres** | **% Total Acres** | **Acres** | **% Total Acres** |
| WUI | 1,611 | 29% | 1,003 | 18% | 608 | 11% |
| CAR | 3,852 | 71% | 906 | 17% | 2,946 | 54% |

Source: Derived from GIS, Medford District BLM

*Fire Behavior.* Fuel models characterize fuel profiles and potential fire behavior. Surface fire behavior models address ground and understory fuels and their potential contribution to fire

intensity and behavior. Crown fire behavior models address the upper canopy and vegetation layers in a stand. Fire behavior modeling was used to analyze the effects of the alternatives.

*Surface Fire Behavior Models.* Fuel models are used to estimate potential fire behavior. Surface fuel treatments greatly reduce heat per unit area, fire line intensity and flame lengths. Flame lengths <4' are safe for direct attack. Flame lengths >4' require indirect attack.

*Crown Fire Behavior Modeling* provides a method for comparing the effects of the vegetation and fuel treatments in each of the alternatives. It provides estimates of the potential for crown fire initiation and sustainability. This is important as it greatly influences fire intensity, fire severity, resistance to control, rates of spread and thus potential resource damage.

*Canopy Base Height and Canopy Bulk Density.* Canopy base height (CBH) and canopy bulk density (CBD) are parameters not included in the above hazard ratings but are important components of overall fire hazard. CBH refers to the distance from the ground to the lowest live limb; CBD refers to the amount of biomass in the canopy. These parameters can be affected by vegetation or fuel treatments in the middle and upper canopies. Currently, stands identified for treatment have high CBD. CBH is typically very low due to the high density understory in the project area.

Air Quality

The population centers of Grants Pass and Medford/Ashland are the closest non-attainment areas. The non-attainment status is not attributable to particulates (PM-10, PM-2.5) from prescribed burning. Major sources of particulate matter within the Grants Pass and Medford/Ashland non-attainment areas are smoke from woodstoves, dust and industrial sources. Over the past eight years the population centers of Grants Pass and Medford/Ashland have been in compliance with national ambient air quality standards for PM 10 and PM-2.5 (Oregon Smoke Management Guide).

In general, air quality in the Illinois Valley is good with limited local emission sources including occasional construction and logging, light industrial, vehicles, road dust, residential wood and debris burning, campfire burning, and smoke from prescribed fire. Emissions impacting air quality are greatest during times of heavy wildfire activity, usually in the late summer. Temperature inversions develop in the Illinois Valley in the winter months and occasionally during the late summer. These trap smoke and reduce smoke dispersal. Burning is highly restricted during these times. The Oregon Smoke Management Program is managed by the Oregon State Forester. All prescribed burning activities are regulated by the State of Oregon to ensure that burning complies with air quality standards.

### 3.6.2 Environmental Consequences

The effects of the alternatives are compared, in part, based on the Fire Regime Condition Class (FRCC) and Fire Management Analyst + (FMA+) modeling. Modeling was done for each of the seven representative forest stand types recommended for fuel treatments to predict fire behavior for surface fires and thresholds for passive and active crown fire, utilizing past weather observations in the Illinois Valley. It compares the number of days of surface fire potential and the number of days that an active crown fire would be sustained under average weather conditions (past 20 years of weather data) for the area. Comparing current fire conditions with post treatment conditions yields relative effectiveness of the alternatives. In order to

characterize stand composition in terms of fuel arrangement, six stands proposed for timber harvest were entered into Fuels Management Analyst (FMA), a fire behavior model.

Canopy base height and canopy bulk density are the two vegetation parameters that influence fire behavior. CBH ranged from 1-10' in unentered/unmanaged stands. CBH was 27' in unit 40-8-23-017 which was thinned in 1997 under the NorEast project. CBD ranged from 0.0018 to 0.0084 lbs/ft$^2$ per acre; the critical threshold for crown fire potential is 0.0023 lbs/ft$^2$ per acre. These numbers illustrate that ladder fuels and high stand densities exist across the project area except in section unit 40-8-23-017.

**Alternative 1: No Action**

Stand Level Effects

No action would continue conditions that have a high potential for large, high intensity fires. Fuel hazard would increase as vegetation continues to develop on current successional trajectories. Surface fuels would increase due to tree mortality in dense stands as higher levels of insect and disease mortality are expected. CBH would decrease due to understory density increases, increasing the potential for crown fire initiation. CBD would increase, as would the potential for active crown fire events. The shift to more shade tolerant species would continue in dense overstocked stands.

With these conditions, wildland fire fighters and the local public would be at greater risk of loss of life and property. Direct attack capabilities would diminish as fuel hazard increases. Initial attack success would decline over time resulting in larger fire sizes. Aerial attack effectiveness would decrease with extreme fire behavior and, as upper and mid level canopies close, penetration of aerial applications of water or retardant would reduce. As a result, in the event of a wildfire, many stands would experience stand replacing wildfires. Table 19 describes modeled (FMA+) fire behavior in each of the seven typical stand types identified for fuel treatments.

**Table 19. Current Condition Fire Behavior Predictions using FMA+**

| Treatment Type | Plot | Stand Type | Env. Conditions | 20' Wind speed (midflame wind speed) | Fire Behavior | Percent Days |
|---|---|---|---|---|---|---|
| No Action Current Conditions | 113619 | Multi-Story Mid closed 11-21"DBH Moderate dead and down FBPS FM 10 | Dry | 0(0) | Surface | 14 |
| | | | | 1-17(1-4) | Passive Crown | 76 |
| | | | | 18(5+) | Active Crowning | 1 |
| | | | Wet | n/a | n/a | 9 |
| No Action Current Conditions | 113631 | Multi-Story Late closed >21"DBH Heavy dead and down FBPS FM 10 | Dry | 0-7.9(0-2) | Surface | 27 |
| | | | | 8-24(2-8) | Passive Crown | 64 |
| | | | | 25(8+) | Active Crowning | 0 |
| | | | Wet | n/a | n/a | 9 |
| No Action Current Conditions | 113637 | Single story Underburned in Longwood Fire Moderate dead and downed FBPS FM 10 | Dry | 0-11(0-3.9) | Surface | 51 |
| | | | | 12-22.9(4-6.9) | Passive Crown | 40 |
| | | | | 23(7+) | Active Crowning | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | Wet | n/a | n/a | 9 |
| No Action Current Conditions | 113931 | Single Story Mid- closed 11-21"DBH Moderate dead and down FBPS FM 10 | Dry | 0-2.9(0-.9) | Surface | 14 |
| | | | | 3-16.9(1-4.9) | Passive Crown | 76 |
| | | | | 17(5+) | Active Crowning | 1 |
| | | | Wet | n/a | n/a | 9 |
| No Action Current Conditions | 113934 | Single Story Late- closed >21"DBH Moderate dead and down FBPS FM 10 | Dry | 0-2.9(0-.9) | Surface | 14 |
| | | | | 3-20.9(1-5.9) | Passive Crown | 77 |
| | | | | 21(6+) | Active Crowning | 0 |
| | | | Wet | n/a | n/a | 9 |
| No Action Current Conditions | 114231 | Poles Mid-closed 5-11'DBH Moderate dead and down FBPS FM 10 | Dry | 0-2.9(0-.9) | Surface | 14 |
| | | | | 3-26.9(1-7.9) | Passive Crown | 77 |
| | | | | 27+(8+) | Active Crowning | 0 |
| | | | Wet | n/a | n/a | 9 |
| No Action Current Conditions | 116670 | Thinned Mid-closed 11-21' DBH Light dead and down FBPS FM 9 | Dry | 0-30(0-9) | Surface | 91 |
| | | | | na | Passive Crown | 0 |
| | | | | na | Active Crowning | 0 |
| | | | Wet | n/a | n/a | 9 |

Source: C. Martin, Fire Ecologist, Medford BLM
Based on approximately 100 days a year July 15th through October 20th

Figures above are based on an average 100 day fire season. For safety and protection of forest resources, the biggest issue is the number of days vulnerable to crown fire which represents the largest deviation from historic conditions. In these areas, historically frequent fire intervals maintained a low probability of crown fire.

Project Level Effects

With the no action alternative, fire regimes 1 and 3 would continue on present trajectories of unnaturally heavy fuel loads, over stocked stands, increases in shade tolerant and fire intolerant vegetation. Lands currently in condition class 3 would remain unchanged until a disturbance occurs. Acres in condition class 1 and 2 would move towards condition class 3. Fire risk would increase with population, residential development, recreation and tourism. The extent of fire condition class 3 would increase. Table 20 estimates the increases in high fuel hazard levels in the project area over the next 10-20 years.

**Table 20. Fire Hazard**

| Time period | Total Acres | High Hazard | | Moderate Hazard | | Low Hazard | |
|---|---|---|---|---|---|---|---|
| | | Acres | % of Total | Acres | % of Total | Acres | % of Total |
| BLM – Current * | 5,463 | 1,576 | 29% | 326 | 6% | 37 | <1% |
| 5-10 Years | 5,463 | 1,949 | 36% | 268 | 5% | 30 | <1% |
| 10-20 Years | 5,463 | 2,746 | 50% | 169 | 3% | 18 | <1% |
| Projections are based on the assumption of 20% acreage increase in the high hazard for the first 5-10 years and an additional 40% for the next 10 – 20 years. | | | | | | | |

As the acreage of high fuel hazard increases, the potential for high severity wildland fire increases also. Strategies and tactics for fire suppression would shift to indirect attack utilizing topographic features such as ridgetops and existing road ways resulting in larger fires. Initial attack suppression goals (94% of new fire starts to 10 acres or less) would become increasingly difficult to attain due to increased fire line heat and flame length. Therefore, the potential for a fire start to develop into a large fire would continue to increase.

In the event of wildfires, air quality would deteriorate due to smoke emissions. The potential for large quantities of smoke over long periods of time and at uncontrollable times as high as observed during the Biscuit fire. During the months of fire season (June – September) weather patterns are often stable creating inversions in the valley bottoms trapping smoke. Additionally, allowing stands to remain in their current condition would not allow reintroduction of fire into the ecosystem.

**Alternatives 2, 3 and 4**

Alternative 2 will have the greatest effect on reducing fire intensities, hazard and risk. These reductions in combination with forest thinning would increase initial attack effectiveness and public and fire fighter safety. Alternative 3 and 4 focus treatments in the CAR, areas of strategic significance and high hazard areas. Total acres do not represent the sum of individual treatments as many acres would receive a combination of treatments.

Stand Level Effects

Stand level effects are similar for all action alternatives due to common fuel treatment prescriptions. In treated stands (Appendix B, Table B-2), surface and ladder fuels would be reduced resulting in low to moderate intensity surface fire. Surface fuel models would be reduced from a FM 10 (>6' flame lengths) to a FM 8 or 9 (<4' flame lengths) which would facilitate direct attack suppression. Stands may experience some overstory mortality (<15%) due to single tree or group torching.

Fuel treatments, tools and prescriptions in each alternative would have similar influence on the structure, composition and fuel loading (Table 21). Surface fuel models would be reduced from a fuel model 10 to a fuel model 8 or 9.

**Table 21. Fuel Treatment Effects Comparison**

| Effect | Alternative 2 | Alternatives 3 and 4 |
|---|---|---|
| Surface fuels reduction | Fuels would be reduced at the highest level of treatment (potential treatment of 1,807 acres) | Fuels would be reduced on fewer acres than alt.2 (potential treatment of 1,333 acres) |
| Increase canopy base height (CBH) | Highest level of CBH increase in both ladder fuels and treatment of the overstory canopy. Highest level of pole and mid-seral condition classes treated. | CBH increased but less than alt. 2. Limited treatment of understory vegetation in the WUI. |
| Reduce canopy bulk density (CBD) | The greatest level of reduction would occur within the pole and mid-seral vegetation classes under the harvest prescription. This in conjunction with the highest level of fuel treatments would have the greatest reduction of CBD. | A lesser level of reduction would occur within the mid and upper canopy. Greatest level of crown fire behavior would be reduced, but under extreme conditions would have the highest level of large tree mortality. |
| Riparian Reserve fuel hazard reduction | The greatest level of fuels reduction (484 acres) within the | Fuels would be reduced, but at a lower level (potential treatment |

| | | |
|---|---|---|
| | riparian reserve. The greatest potential of retaining key ecosystem components in the event of wildfire. | acres 293) Higher probability of losing key ecosystem components. |
| Fire Condition Class | The greatest level of fuels reduction in stands classified as FCC 3. Risk of losing key ecosystem components is lowest. | Less fuels reduction in FCC 3. The risk of losing key ecosystem components is the reduced at a lesser level. |
| Fire Hazard | Treat 85% of high hazard areas. | Treat 63% of high hazard areas. |

*Initial fuel reduction: understory thinning.* Thinning reduces the potential for surface fires to become crown fires. Reducing canopy fuels and eliminating ladder fuels would decrease the probability that a crown fire will initiate and spread (Cron 1969; Omi and Martinson 2002; Scott and Rhinehardt 2001; Stephens 1998). Stands would be thinned to varying degrees of % canopy openings, reducing CBD and increasing CBH. An increase in solar radiation on the forest floor may increase surface temperatures, decrease fine fuel moisture, decrease relative humidity, and increase surface wind speeds compared to un-thinned stands, thus increasing fire hazard if surface fuels are untreated. Therefore, surface fuels would be reduced to minimize the potential for high severity, high intensity fire.

*Initial fuel reduction: handpile burning.* Handpile burning is conducted in the late fall through early winter when surface and ground fuels are wet, greatly reducing the spread of surface fire. As a result of these wet burning conditions, it can be expected that ≤10% of each individual pile would not be consumed leaving pile "rings" and that ≤5% of the piles on the site would not burn resulting in scattered pockets of surface fuels remaining on site. These residual fuels would be reduced with subsequent underburning treatments. Handpiles are generally burned the following fall or winter after they are constructed. However, piles would not be burned if piles did not have enough time to cure or if air quality objectives could not be met. In these situations, the piles would remain on site for one full burning season.

*Initial fuel reduction: underburning.* A typical underburn would reduce 70% of the fine dead 1-100 hour time lag fuels (0.25-3" diameter) and 50% of the 1,000 hour time lag fuels (3-9" diameter). In most units 10,000 hour time lag fuels (>9") are retained but it can be expected that up to 10% would be consumed, mostly in the smoldering phase. A high percentage of the loss of the large woody material is through outer layer charring, often reducing the overall diameter but not consuming the entire log. During fall burning conditions when fuel moistures are lower an increase up to 25% consumption can be expected.

*Maintenance underburning:* Periodic low intensity underburns would be used to maintain units in low fire hazard condition. Frequency and location of the underburns would be based on predicted fire behavior (flame lengths ≤4), the representative fire regime and subsequent vegetation response. It is estimated that maintenance burning throughout the project area would be on a 7-15 year rotation in areas classified as fire regime 1 and on a 10-30 year rotation for areas within fire regime 3. Smoke emissions will be localized and below health hazard standards due the low fuel loadings. Mortality to the residual stand will be minimal (<5%) as fire intensities would be low.

Plots from the Long Term Ecosystem Productivity (LTEP) study site located on the Chetco Ranger District were burned by the 2002 Biscuit Fire. (Raymond, Crystal L. and David L. Peterson, in press.) "Thinned and then underburned plots had the least crown scorch volume and cambium death in the overstory trees…mortality was least severe in thinned and then underburned stands with <5% mortality".

Project Level Effects

Due to increasing population and recreation in the Illinois Valley, fire risk is expected to increase. The priority in all action alternatives is to treat activity fuels and stands in and adjacent to the CAR. Table 22 displays acres treated in the project area by alternative. Alternative 3 and 4 focus fuel hazard reduction treatments in the CAR and strategic areas on main ridgelines. Alternative 2 treats these areas and more of the WUI adjacent to the CAR.

**Table 22. Fuel Treatment Comparison by Alternative**

| Alternative | CAR | WUI | High Hazard | Total Acres |
|---|---|---|---|---|
| 2 | 92% | 94% | 85% | 1,776 |
| 3 and 4 | 89% | 52% | 63% | 1,348 |

Treatments are common to alternatives and therefore the effects would be similar. The difference is in the objective, reflected in the difference in acres treated. Treated stands would be more resistant to crown fire due to the reduction in the crown base height and crown bulk density, reducing mortality to overstory vegetation in the event of a wildland fire. All alternatives would result in a reduction of the potential for large scale, high intensity fire as fire suppression would be more successful across the project area. Alternative 2 would have the greatest number of treated stands at all elevations (valley bottoms, mid-slope, ridgetops) throughout the project area, minimizing potential fire spread from untreated stands. Alternative 3 and 4 treats fewer acres within the WUI designation focusing on CAR and strategic areas. The untreated stands would have the same wildfire behavior and intensity as those described in the no-action alternative.

**Cumulative Effects**

Air Quality

There are four known fuels reduction projects that would impact air quality in the Illinois Valley. The Page Creek Fuels Reduction Project (USFS, 1,200 acres), Longwood Fire Fuels Reduction Project (USFS, 740 acres), the Anderson West Project (BLM, 780 acres) and the West Fork Illinois Project (BLM, 2,618 acres). It is anticipated these projects and the East Illinois Project would be implemented over a five year period. All prescribed burning activities will be regulated by the State of Oregon to ensure that burning complies with air quality standards. Therefore, alternatives 2, 3 or 4 are not expected to contribute cumulatively to any air quality impacts beyond the short term impacts previously stated.

Fuel Reduction and Fire Behavior

Since 1990, 174 acres of UT/HP/B, 375 acres of mechanical treatment and 25 acres of UB have been completed on BLM land in the East Fork Illinois watershed. Approximately 2,618 acres are planned in the next five years under the West Fork Illinois project. Combined with the proposed action which treats up to 1,807 acres, 4,999 acres (9 % of the East Illinois watershed) would be treated; 33% of the project area would be treated.

The proposed fire hazard reduction in alternatives 2, 3 and 4 would return a large portion of the project area to near historical ranges of fuel loadings, CBH and CBD. This would result in a substantially reduced fire hazard and associated loss to values at risk in the project area. It would complement several other fuel reduction projects (including Free and Easy, Deer Mom, 3 + 3, West Fork Illinois, NorEast, Tennessee Lime and NFP grant projects) currently being implemented or planned in the Illinois Valley. Wildland firefighter and public safety would

greatly increase in treated areas and direct strategies and tactics could be utilized to control the fire, resulting in fewer acres burned and less threat to private property.

While the potential for high severity fire is expected to decrease by creating fire-resilient forests, predicting fire behavior in all instances is very difficult. Studies by Pollet and Omi (2002), Moore et al (1955) and Van Wagner (1968) provide strong evidence of fuel treatment efficacy. However, even with past and anticipated treatments, the potential for a high severity fire remains very high across the watershed due to the level of untreated acres and unpredictability of human caused fires. It can be expected that extreme fire behavior would be moderated in treated stands and overstory mortality greatly reduced compared to untreated stands. Based on FMA+ modeling, untreated stands would initiate passive crown fire and under high wind conditions sustain active crown fire behavior. In these instances, fires starting on BLM managed land would adversely affect adjacent private lands as crown fires would likely carry from BLM to private lands. Conversely, fires originating from private lands would adversely affect BLM managed lands as crown fire would carry onto BLM lands.

## 3.7 Recreation/ Visual Resources/Cultural Resources

### 3.7.1 Affected Environment

**Recreation**

The project area provides dispersed recreation opportunities of hiking, biking, horseback riding, sightseeing, swimming and camping. Small businesses in the area support day trips and camping. These are on private land but users may hike on nearby public land. The majority of recreation use comes from local residents.

Within the project area are a multitude of historic mining remnants, miles of historic mining ditches, and existing non-designated recreation trails built in the 1970s. The area is receiving increasing recreational use by adjacent landowners and the neighboring community. Many of the historic ditches have been cleared and are being used as trails. These ditches generally contour along the landscape. The non-designated trails provide links between ditches and provide access to ridge tops and streams. Many jeep trails provide additional links to a non-designated trail system. The majority of this trail system is in sections 27, 28, 33 and 34, T40S, R8W. There are also trails and dispersed camp/day use areas in section 23 off Rockydale Road and in the Hope Mountain area.

The project area has open, limited or closed categories for off-highway vehicle (OHV) use (RMP p.109). In open areas, all types of OHVs are permitted at all times in any location subject to operating regulations and vehicle standards. Limited areas are restricted by time, location, and OHV type. OHV use is prohibited in closed areas (43 CFR, subparts 8341 and 8342).

The area has spiritual value for many local residents. Spiritual values are personal and vary from person to person. Therefore, it is not possible to ascertain value or to measure economic benefit. While these values cannot be quantified, residents place a high value on the opportunity to experience recreation and solitude.

Forest stands in the project area contain intrinsic values of wildlife, vegetation, soil and water resources. Old growth stands are limited, occurring in a 70-acre area of tanoak.

**Visual Resources**

The project area is in Visual Resource Management (VRM) Class III, the objective of which is to partially retain the existing character of the landscape. The level of change should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape (BLM Manual 8431).

The valley portion of the watershed is characterized by human alterations of the landscape ranging from square forms of houses/structures and vertical/horizontal lines of roads, powerlines, and fences. There are very few developments along the slopes and ridges in the watershed. The vegetation in the project area varies from open meadows in the valley, to young/mid and older forest stands, with some serpentine openings, especially in the northern part of the project area. The older stands are generally homogenous in appearance, with little variation in form and color from a distance. The lower slopes on BLM land are often blocked by foreground vegetation on the valley floor. The middle slopes and ridgelines are more visible due to the flat topography of the valley floor and some longer views, especially in the northern part of the project area. Views to the north generally are longer than the east/west views, due to the layout of the valley in a north/south direction. The portion of the valley which runs east and west offers easterly views of the ridges outside of the project area on Forest Service land. Views to the west are also outside of the project area. Following is a breakdown of Key Observation Points (KOP) which are usually located along commonly traveled routes or at other likely observation points (BLM Manual 8431).

KOP #1: Rockydale Road looking east to units in section 15 and 23: flat, some limited visibility of section 15 from Rockydale Road at the junction of Rockydale and BLM road 40-8-15. After that, the western portion of the BLM land in section 23 is blocked by private land, which is directly adjacent to Rockydale Road.

KOP #2: Rockydale Road heading south. A portion of a north facing ridge in section 27 would be visible from Rockydale Road while heading south.

KOP #3: Waldo Road, heading to the west: If looking south, there are views of the north facing ridges above Sailor's Gulch.

KOP #4: Bridgeview-Takilma Road heading north: There are views to the south-facing slopes and upper ridges in sections 23 and 24. There is a portion of private land on the ridge between the saddle in section 23 and section 24.

KOP #5: Takilma Road heading south: At the point where the road takes a sharp turn to the west, there is a view of the slopes and ridgetop in section 27 (ridge to the south of Sailor's Gulch) and the north/south trending ridge between Allen Gulch and the East Fork Illinois River. There are some side views to this same area while traveling on the road in a general north/south direction.

KOP #6: Takilma Road heading north: There are views of the west facing slopes and ridgeline in section 35, especially when the road turns sharply to the east. Traveling in a general north direction, there are some side views of section 35 and 26 ridges.

KOP #7: Waldo Road, heading east: There are views to the west-facing slopes on Forest Service land outside of the project area. (This KOP does not include BLM land, so there will be no further discussion based on this location).

**Cultural Resources**

The project area is in a region that has a rich and unique history, especially in mining. The earliest discovery of gold in Josephine County occurred in the Illinois Valley at Sailor's Diggings in 1851 and the historic development of the county is directly tied to gold mining (Atwood et al. 2000). This rich find followed by others brought a large influx of miners into the area. As miners came into the area whole towns sprang up overnight. By the mid-to-late 1850s mining had become commonplace and a regular element of southwestern Oregon (USDA, USDI 1999). After the First World War, very little mining was being carried out in the area; however, the effects of mining on the landscape are still evident today. Sites in the project area include mining landscapes representing the development of different mining technologies, town sites associated with mining activities, cemeteries, isolated habitation flats and refuse scatters. Very few prehistoric sites have been recorded in the project area. Cultural resource inventories have been completed in the project area.

Previous archaeological research in the project area includes several small BLM management related survey projects and the Esterly Lakes Cultural Resource Survey (Buddy and Tonsfeldt 2002), encompassing approximately 3,700 acres. The Esterly Lakes survey included lands in the East and West Fork Illinois River watersheds. Twenty-seven sites were recorded in the East Fork Illinois watershed, 25 of which are historic and two, prehistoric. The historic sites represent a full range of local mining history including early transportation routes between Crescent City, California and southern Oregon. The mining site chronology extends from the discovery in Sailor's Gulch in the early 1850s to more recent prospecting in the 1930s and 1940s and includes sites representing all the major technological developments associated with hydraulic mining. Of the 27 historic sites, eleven are listed on the National Register of Historic Places.

### 3.7.2 Environmental Consequences

**Alternative 1 - No Action**

Recreation

In the no action alternative, existing non-designated trails and historic ditches would continue to receive use by the local community. Historic ditches would continue to become more overgrown with vegetation, except where cleared by local users. There would be no opportunity to develop interpretive outreach materials about the historic mining that took place in the area. Parking for trail/ditch access would be limited to wide spots along Waldo Lookout Road. Continued recreational use of the non-designated trails and historic ditches would increase the risk of fire starts. Given the increase in population it is expected that recreation use would increase in the future.

Visual Resources

There would be no visual alterations of the landscape. Class III VRM objectives would continue to be met unless stand replacing fire occurred.

Cultural Resources
Fuels build-up would continue to increase and could result in a catastrophic fire which could threaten or destroy cultural resources. Vegetation would continue to encroach on cultural resources and could result in the damage and/or destruction of those resources. No interpretive signs would be used to help identify the sites and make them meaningful to the general public, who may otherwise not be aware of the cultural significance of the area.

**Alternative 2, 3 and 4**

Recreation
Approximately 9 miles of trails/ditches would be maintained or improved. Approximately one half mile of new trail would be constructed, providing the public with low elevation, easily accessible recreation opportunities. This system would allow for a variety of loops along already existing historic ditches and trails/roads. The trails built in the 1970s receive considerable use today by hikers, horseback riders, and mountain bikers and provide interpretive opportunities that will enhance understanding of the abundant historic mining resources located along their reach (Budy 2000). Trailhead improvement would provide safer ingress and egress by providing adequate, designated parking areas for vehicles.

Fuels and harvest work on BLM would reduce understory vegetation, creating potential illegal/unauthorized OHV use. Skid roads also create opportunities for OHV use. However, blocking roads at intersections with main roads would reduce OHV use potential. If OHV use increases as a result of this project and resource damage appears probable, area closures and increased law enforcement patrols would be implemented. Effects of OHV use in open or designated areas are expected to be within the range anticipated in the RMP.

Fuels treatments (hand piles) may be visible from trails in the short term. However, by treating the fuels adjacent to the ditches and trails, the potential for a stand-replacing fire would decrease, reducing the risk to resources that make the area desirable for outdoor activities.

In the short term, new trail construction would increase bare soil along the trail tread and cut banks. Over the long term, the new trails would be covered with duff and blend in with the landscape. Adequately built trails for hiking, biking, and horseback riding would reduce user-created non-designated trails by providing the public with well maintained trails to access recreational opportunities.
.
Visual Resources
Visual resources have been analyzed by treatment type. The following information is common to all alternatives.

*Density Management/Modified Group Selection*: This treatment would increase browns/light greens and tans, as more understory and ground would be visible. Small openings (1/8 to 1/4 acre) around large pine and non-tanoak hardwoods would repeat the characteristic lines and forms found on the existing landscape. Management activities may attract attention of the casual observer, but would not dominate the view. The proposed treatment would meet VRM III objectives.

*Commercial Thin*: This treatment would retain the most vigorous dominant and co-dominant overstory trees. Post treatment, there would be more light greens and browns from the understory. However, the overstory would remain dark green with slightly more rough edges, as

spacing between trees increases, especially along ridgelines, where there may be more light/sky visible through the trees. Due to the level of canopy closure being left, the existing variability of the characteristic landscape and the project design features of mimicking the characteristic landscape, the treatment would meet VRM III objectives.

*Restoration Thinning*: Restoration thinning is proposed on drier sites and would retain vigorous pines and oaks. This treatment would mimic the characteristic landscape of a drier site and the removal of smaller Douglas-fir would be consistent visually with a drier site. Due to the project design features of feathering treatment edges, clumping leave trees and mimicking the characteristic landscape, this treatment would meet VRM III objectives.

*Selective Cut*: Selective cut treatments would remove only the suppressed and intermediate trees with low crown ratios. Removal of these types of trees would not change the current canopy closure of the stands. These treatments would not be visible to the casual observer and would meet VRM III objectives.

*Fuels Treatments*: These treatments include cutting small diameter understory, handpiling and burning, underburning. These treatments would slightly increase patterned shapes to the landscape in the short term. However, these patterns would not be noticeable to the casual observer, due to the existing landscape, which is discontinuous from both natural and human influences. In the long term, these treatments would preserve the landscape from a stand replacing fire.

*Summary:* The watershed is characterized by development along the valley and human alterations of the characteristic landscape. The vegetation and land forms within the project area are very diverse, from flat valley bottom vegetation and meadows, to slopes and ridges with serpentine openings and young/mid and older forest stands. Effects of the proposed treatments on visual resources include short term increases in browns and light greens as the understory becomes more visible. The texture of the vegetation would become slightly rougher when 1/8 to 1/4 acre clearings around large dominant trees are created. Vertical lines in thinned stands would be slightly more pronounced in the foreground views, as individual trees may become more visible, especially on the ridges. From longer, further views of thinned stands, edges would become more blurred. These changes to the landscape would meet VRM III objectives, due to the fact that they would blend with the characteristic landscape which is already varied by human alterations, as well as a variety of vegetation types. Project design features such as feathering, irregular shapes, avoiding straight lines and screening would also aid in meeting VRM objectives.

Cultural Resources

All known cultural sites have been identified. Proposed treatments would occur near the cultural resources. The sites would be buffered and no activities will occur within the buffered area, except for the brushing along the historic ditch trails and a small area of biomass utilization within the boundaries of the Platurica Cut.

Brushing and clearing of the proposed ditch trails could facilitate unauthorized OHV use by providing a more open trail system. Cultural resources, including the ditches along the trails could be damaged. However, this potential damage should be minimal due to signs designating trails as closed to OHVs and monitoring/enforcing compliance. Reporting of illegal OHV use by recreational users of the trail system would also be an effective deterrent to illegal OHV use.

With implementation of the project design features, no impacts are anticipated to the sites as a result of the proposed activities.

**Cumulative Effects**

Recreation
With the increase in development of the Illinois Valley, establishment of a specific area for recreational use would more effectively manage recreation opportunities for non-motorized use. Establishment of designated trails would reduce development and use of unauthorized user-created trails on nearby public and private lands. The trail system would provide a recreation experience which could be maintained. Development of the Allen Gulch trails could also provide the impetus to continue to develop additional low elevation, easily accessible historic ditches and trail systems on public lands. This trail system would also complement other trail developments in the Illinois Valley (i.e. Kerby Peak Trail, Eight Dollar Mountain Boardwalk Trail, Rough and Ready Trail).

Cumulative effects of projects in the East Fork of the Illinois River watershed on recreation activities may include increased unauthorized OHV use in low elevation, easily accessible units, once those units are opened up after vegetation treatments have occurred. Due to the many roads and trails open for OHV use unauthorized use should be minimal.

Visual Resources
Cumulative effects of projects in the East Fork of the Illinois River watershed on visual resources would be negligible, due the type of prescriptions proposed, and PDFs that blend treatment with surrounding, visually varied, human altered landscape. Changes would not dominate the view of the casual observer. Comparable harvest prescriptions and PDFs implemented on recent forest management/commercial thinning projects in the Grants Pass Resource Area are not noticeable to the casual observer due to vegetation screening and prescriptions that blend treatments with adjacent areas (e.g., Round Bull along Hwy 199, Stratton Hog along the Rogue River, and Savage Green along Interstate 5).

Cultural Resources
Cumulative effects include increased protection of cultural sites on federal lands, including protection from fire. These sites are important, as they are often the last remnants of history and prehistory in the area, due to the lack of protection of sites on private lands.

This project also has components which will increase public awareness and appreciation of cultural resources through the development of a trail system and interpretive opportunities describing the unique history of the Illinois Valley.

## 3.8 Nominated ACEC Key Values

**Effects of all Action Alternatives**

Soil / Water
The action alternatives would not diminish the unique geology or soil chemistry in the nominated Waldo-Takilma ACEC. There would be no skid trails or roads developed on soils units which would compromise meeting relevance and importance criteria included in the ACEC nomination. PDFs reducing impacts to slope stability and surface erosion would protect fragile soils across

the project area. Thus, the important soil values providing habitat for a highly diverse plant assemblage would be maintained.

Rare Plants
The action alternatives would not diminish botanical values in the nominated ACEC. PDFs would ensure that a mosaic of plant communities continue to protect the exceptional biological diversity of the area. The proposed actions would not reduce or degrade habitat for the variety of rare, S&M and SS plant species in the nominated ACEC.

Populations would not be impacted by the action alternatives because they would be buffered. Most of the rare, S&M and SS plant species in the nominated ACEC are found in serpentine savannah communities. These communities would benefit from habitat restoration thinning and burning.

Alternative 1 (no action) may result in a reduced populations of certain species (e.g., *Erythronium howellii)* that require edge conditions and canopy openings due to shrub and tree encroachment resulting from fire suppression and the lack of thinning.

Cultural Resources
The action alternatives would not diminish the unique cultural resources in the nominated ACEC. The sites would be buffered from damaging activities. The action alternatives would benefit some cultural sites by reducing the fuel hazard around the sites. Additionally, proposed recreation activities would improve access and interpretation of the ACEC.

# 4.0 Agencies and Persons Consulted

## 4.1 Public Involvement

The current project was initially planned in coordination with the Forest Service as part of the Upper Illinois Landscape Management Project and a joint agency Environmental Impact Statement (EIS) was initiated. Scoping began in 1999 with a letter to residents and landowners near or adjacent to the planning area, to federal, state, and county agencies, and to private organizations and individuals that requested information concerning projects of this type. Over 300 responses were received. In 2001, a letter was sent to the public to provide an update on the progress of the EIS and to announce that because the responses were primarily related to the East Fork Illinois portion of the project area, the EIS would focus on the analysis of that area while the analysis of the BLM lands in the West Fork Illinois watershed would proceed separately as an Environmental Assessment (EA). Members of the Forest Service and BLM planning teams met with the Illinois Valley Forest Action Committee and presented the East Fork Illinois River Watershed Analysis, which was revised by the joint team during the development of the EIS. The BLM planning team members met with a citizen group from the Takilma community to present the project and discuss their concerns.

Following the Biscuit Fire in 2002, the Forest Service directed their planning efforts to the burn area and away from the East Fork Illinois watershed. In 2005, the BLM decided to proceed with its own planning for the East Fork Illinois Landscape Management Project on BLM lands. A letter was sent to the public in September 2005 updating neighbors and interested citizens on the status of the project, announcing the decision to analyze the project on BLM land through preparation of an EA, and inviting them to contact the BLM with information, comments and concerns. A second letter was sent in November 2005 which invited interested persons to

comment on the proposal and also announced an open house meeting at the City Hall in Cave Junction, Oregon, held on November 30, 2005. The open house provided an opportunity for community members to meet the planning team and BLM management, who presented displays and handouts highlighting the scope of the project as well as the issues and concerns that supported action in the planning area. Planning team members presented an overview of the draft action alternatives that had been developed based on scoping responses and analysis of the project area.

Members of the Takilma Watershed Committee (TWC) coordinated and conducted a subsequent town meeting which was held on January 12, 2006 at the Community Building in Takilma. The BLM planning team posted project maps and gave a presentation explaining the action alternatives. More than 150 residents were then given a minute each to express concerns. A sound recording of the meeting was given to the field manager, who was not able to attend. In addition, written comments and questions were collected. The BLM received two sets of questions regarding the project from the TWC and residents. Responses were sent to the TWC prior to the completion of the EA.

Conversations with BLM employees and adjacent landowners/residents about the project have occurred by arrangement and as crews performed field work. Letters, phone calls, meetings, and field visits during initial scoping solicited the following issues or concerns:

- Fire risk and hazard (e.g., high stand densities, long history of fire suppression, the high fire hazard and risk, risks of prescribed fire)
- Quality of life/amenity values (e.g., proximity of rural residences to the project area, great importance of forests to local residents, current and potential recreation uses)
- Water resources (e.g., the condition of and effects on water quality, water quantity and riparian areas, relationship of road conditions to water quality)
- Vegetation condition and species/habitats of concern (e.g., late successional and old growth forests and habitats, unique vegetation types and botanical conditions, declining extent of some habitat types, exceptionally high forest stand densities)
- Fish habitat conditions
- Cultural and historical resources (e.g., exceptional and historical and cultural features in the project area)
- Economics (e.g., the appropriateness of commercial logging, the importance of economically viable projects)
- Support for maintaining BLM roads, blocking destructive public access to BLM land, and decommissioning some BLM roads.
- Protection of older forests and lower elevation forests to provide habitat connectivity
- Prohibiting commercial logging in the BLM forests near Takilma and the need to develop sustainable use of forest products without timber sales
- Support for the selection of the "No Action" alternative
- Ecotourism instead of extractive use

During the scoping process the TWC, with support from community members, expressed interest in submitting an alternative that would be included in the EA. The project planning team considered the option of analyzing a citizen alternative. The team decided not to enter into a cooperative agreement to include the alternative in the EA but to instead consider it as public input along with all other comments and concerns received through the scoping process. After receiving *Alternative Five of the BLM East Fork Illinois Project* from the TWC, a core group of the BLM planning team met with representatives of the TWC three times, including a field visit

to the project area. The objective of these meetings was to clarify the alternative and determine if it could be represented in an existing alternative of the EA. In the third meeting, the TWC subcommittee members were able to voice their concerns directly to the field manager.

An additional field meeting was coordinated with residents associated with the Magic Forest Farm in Takilma and took place on March 16, 2006. The project hydrologist and the fisheries biologist visited with the neighborhood group and hiked through the Hope Mountain area of the project to discuss water quality concerns and various proposed actions. A representative of the Rockydale Neighborhood Association, another resident group, contacted the project coordinator by telephone to discuss concerns regarding proposed actions on BLM land near Rockydale Road, and several nearby residents made contact by phone as well. This extensive public input was considered by the planning team in developing the proposal and EA.

The following agencies were consulted during the planning process: Josephine County, US Fish and Wildlife Service, National Marine Fisheries Service, and Oregon Department of Fish and Wildlife.

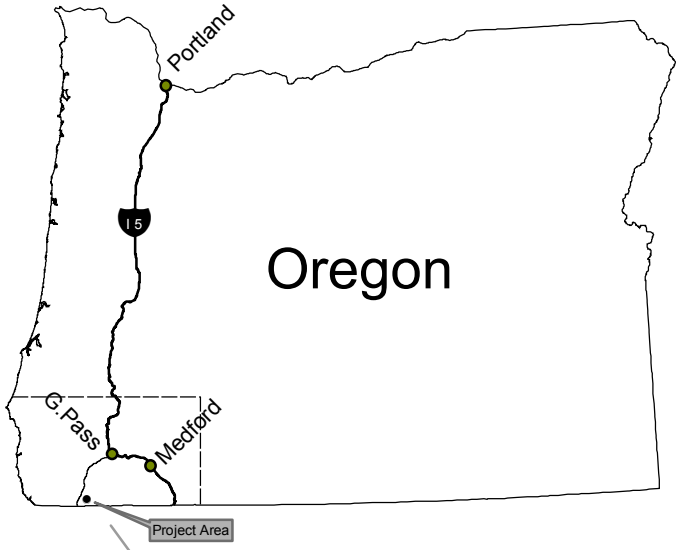
### 4.2 Availability of Document and Comment Procedures

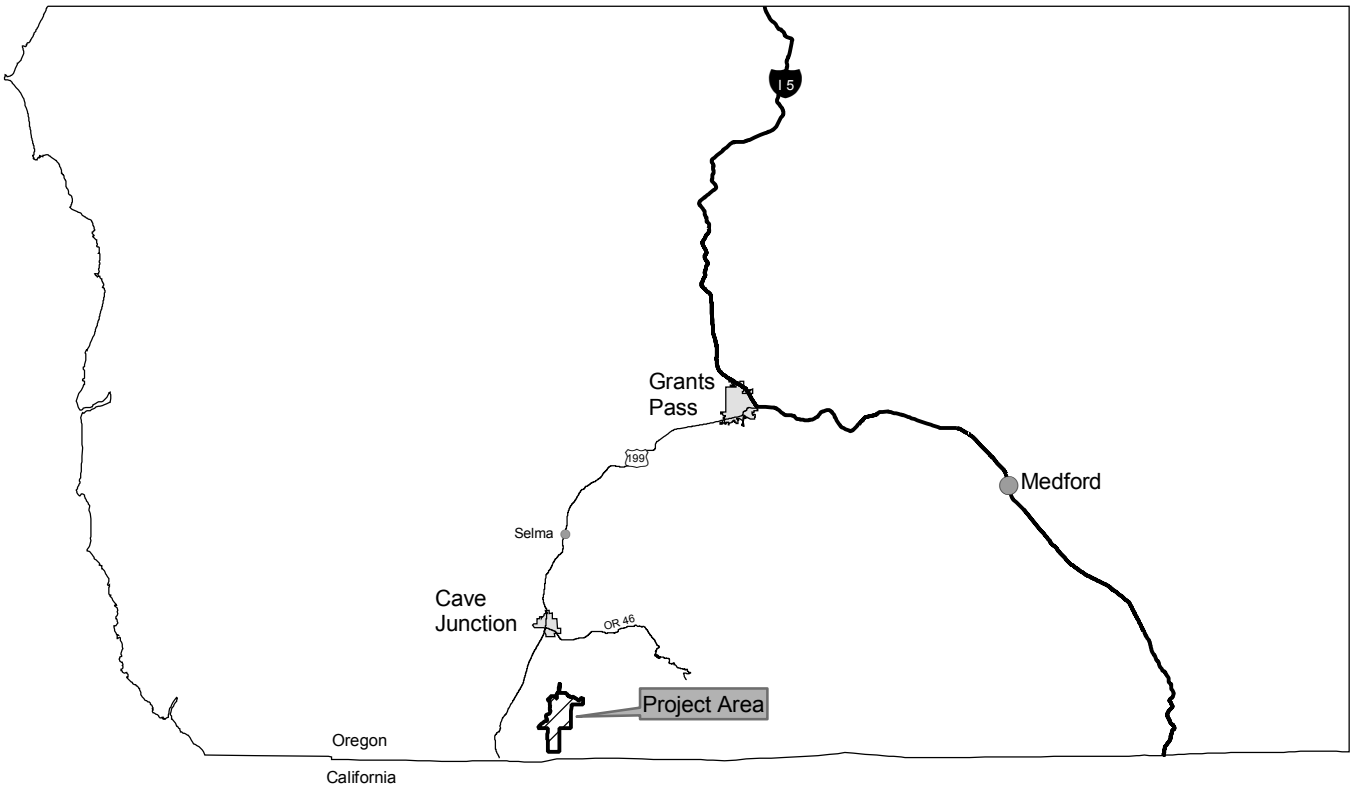
Copies of the EA will be available for public review in the Grants Pass Interagency Office. A formal 30-day public comment period will be initiated by an announcement in the Grants Pass Daily Courier. If you would like a copy of the EA, please stop by the office or contact Jon Raybourn, project lead, at (541) 471-6635. Written comments should be addressed to Abbie Jossie, Field Manager, Grants Pass Resource Area, at 2164 NE Spalding Avenue, Grants Pass, OR 97526. E-mailed comments may be sent to *or110mb@or.blm.gov*.

# Appendix A. Maps

# East Illinois
# Landscape Management Project

## Map 1 - General Location



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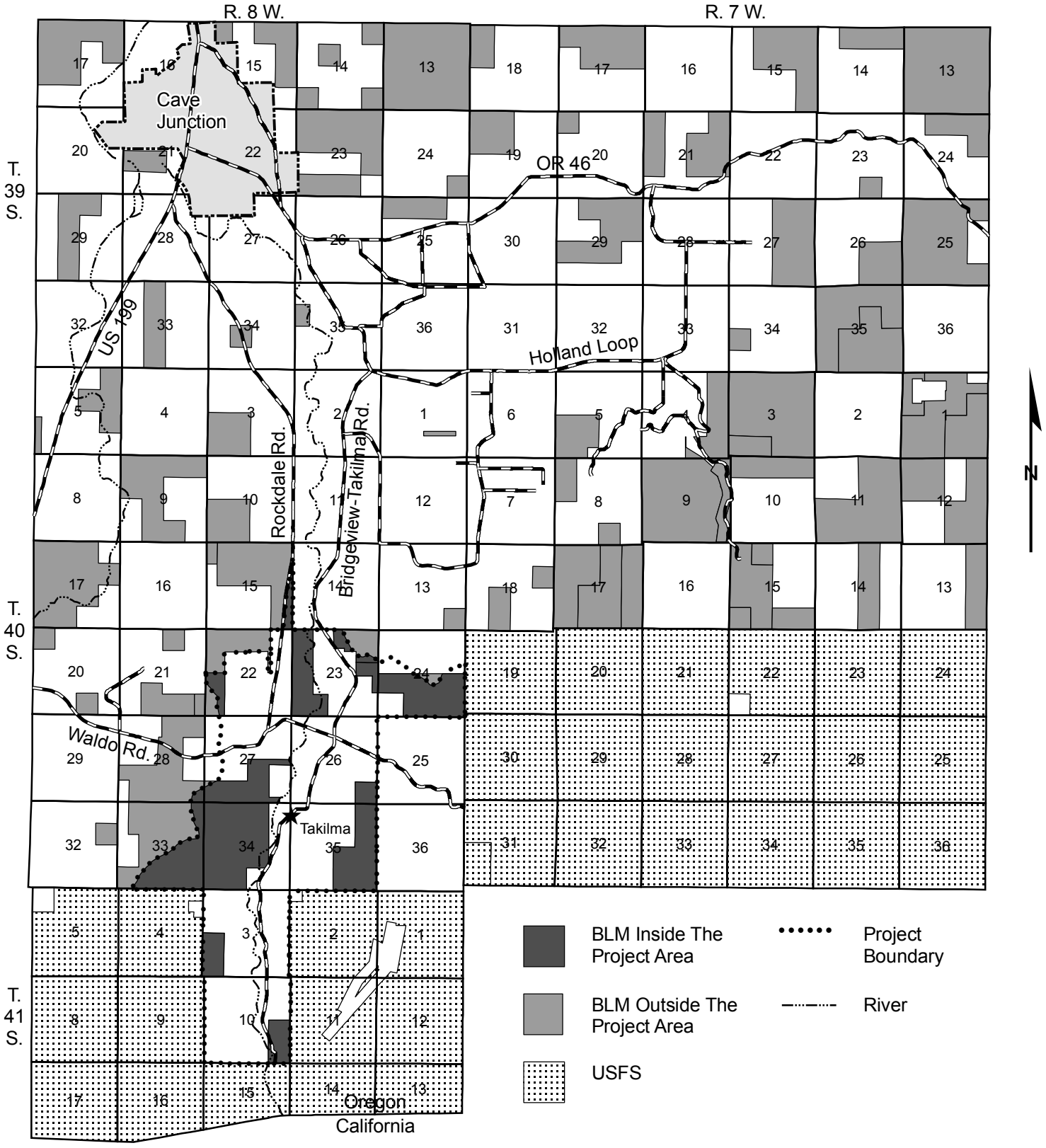
# East Illinois Landscape Management Project




# Map 2 - Project Location

Scale: 1/2 inch = 1 mile



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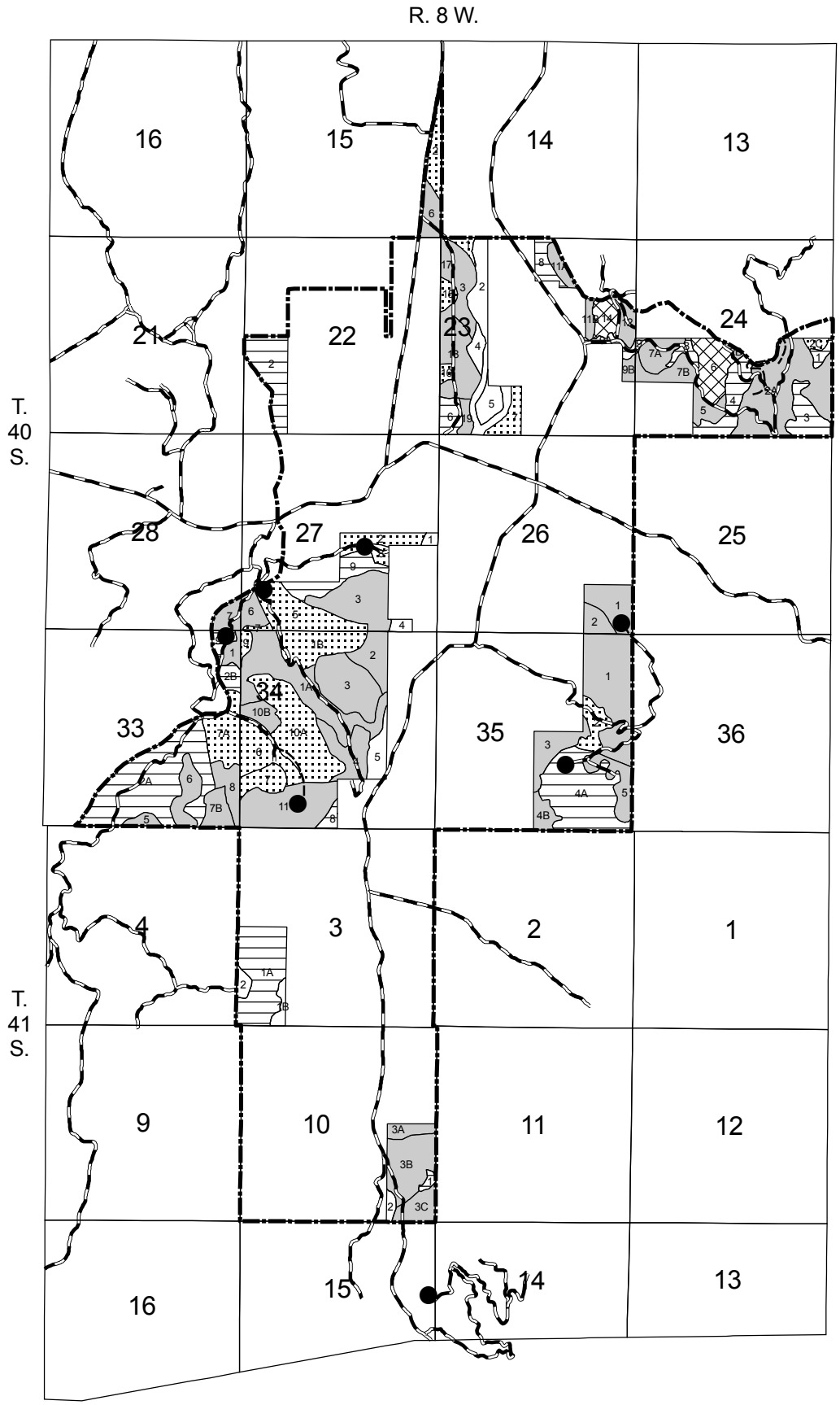
Creation Date: 8/26/2005 10:49:55 AM
Machine: ILMORMD40481674

# East Illinois Landscape Management Project




Timber Harvest

Yound Stand Management

Wildlife Habitat Restoration

Fuel Hazard Reduction

No Treatment

Proposed Spur

Proposed Helicopter Landing

Project Boundary

Scale: 1.25 inches = 1 mile

## Map 3 - Alternative 2



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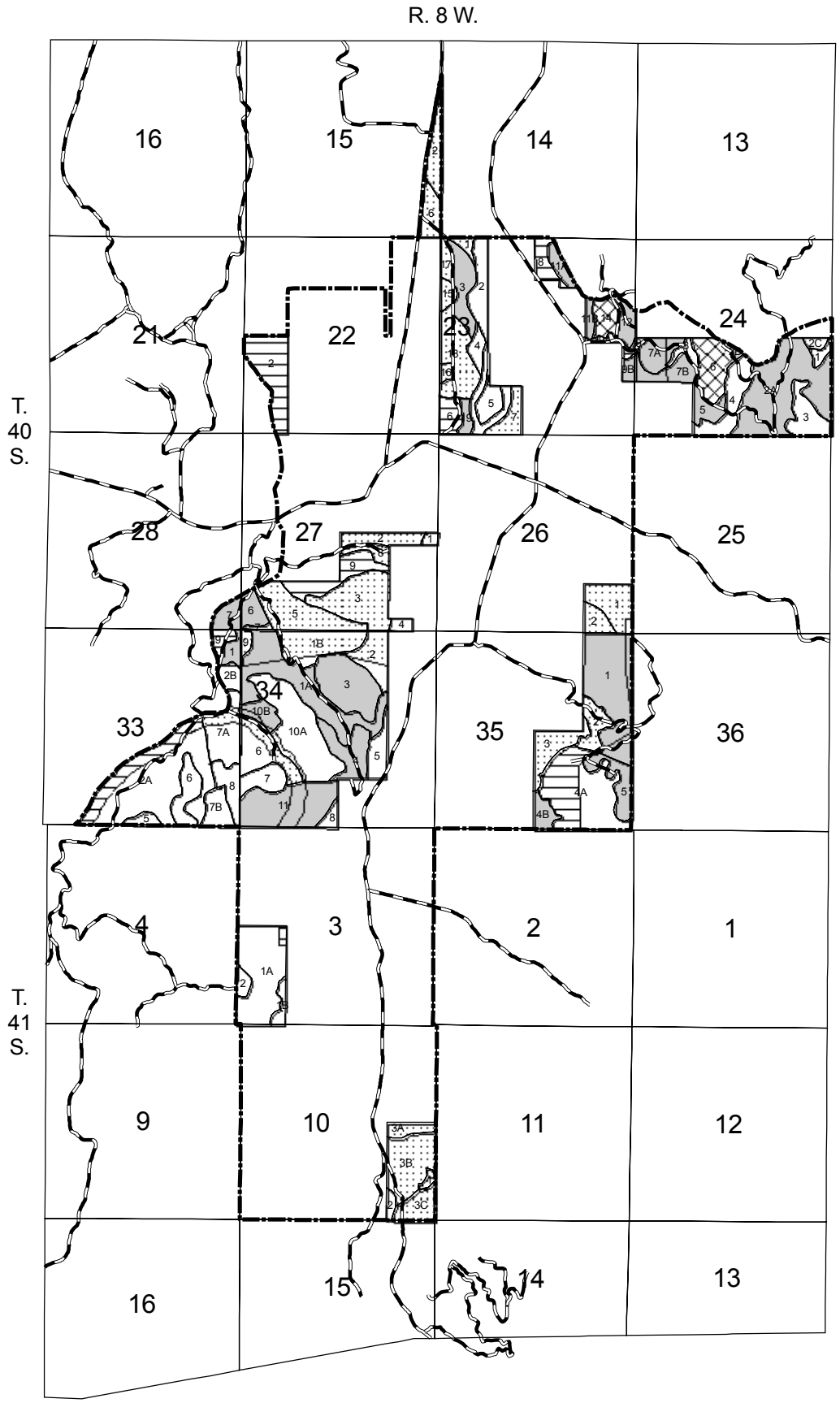
# East Illinois Landscape Management Project




Timber Harvest

Yound Stand Management

Wildlife Habitat Restoration

Fuel Hazard Reduction

No Treatment

Project Boundary

Scale: 1.25 inches = 1 mile

## Map 4 - Alternative 3



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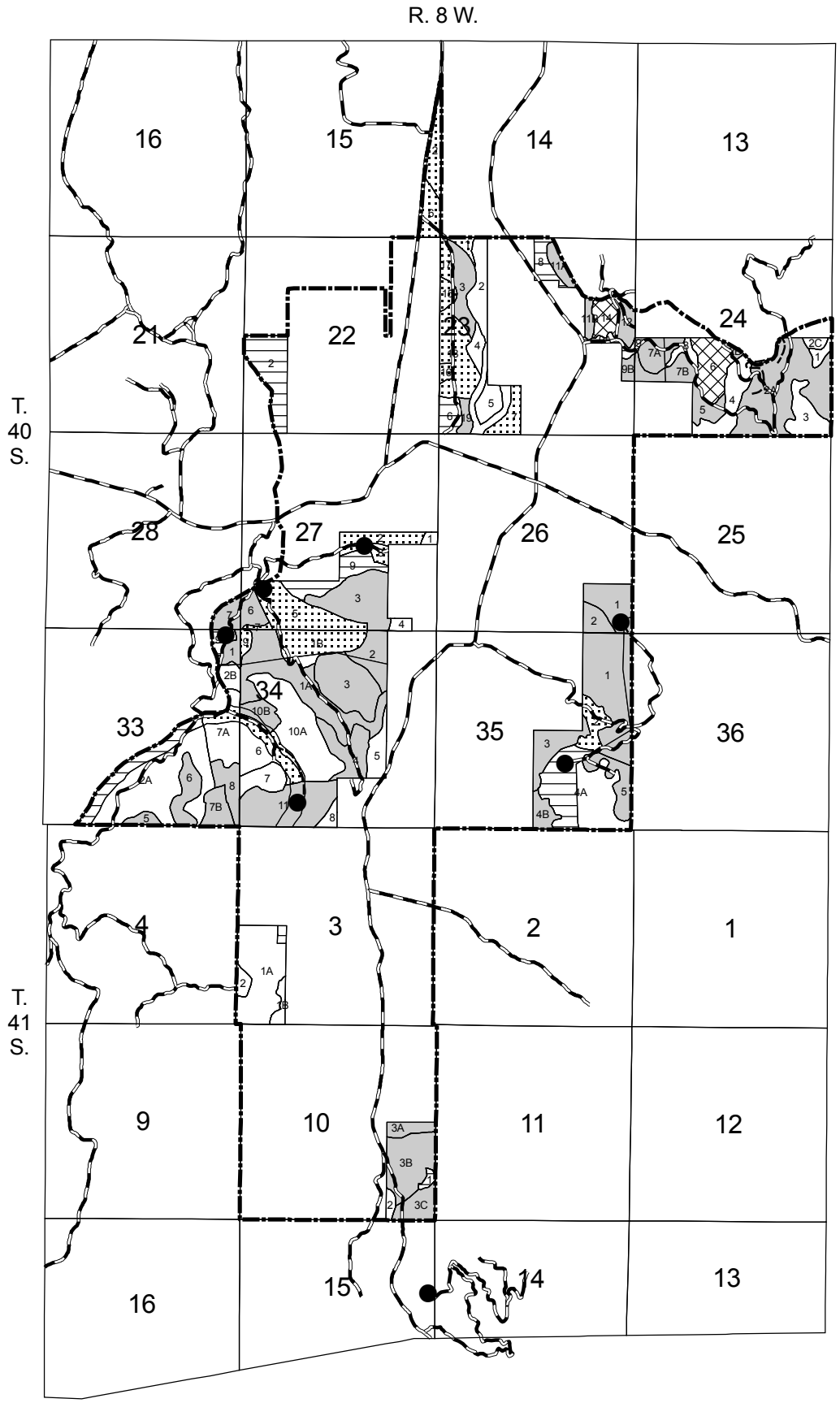
Machine: ILMORMD40481674

# East Illinois Landscape Management Project




Timber Harvest

Yound Stand Management

Wildlife Habitat Restoration

Fuel Hazard Reduction

No Treatment

Proposed Spur

Proposed Helicopter Landing

Project Boundary

Scale: 1.25 inches = 1 mile

## Map 5 - Alternative 4



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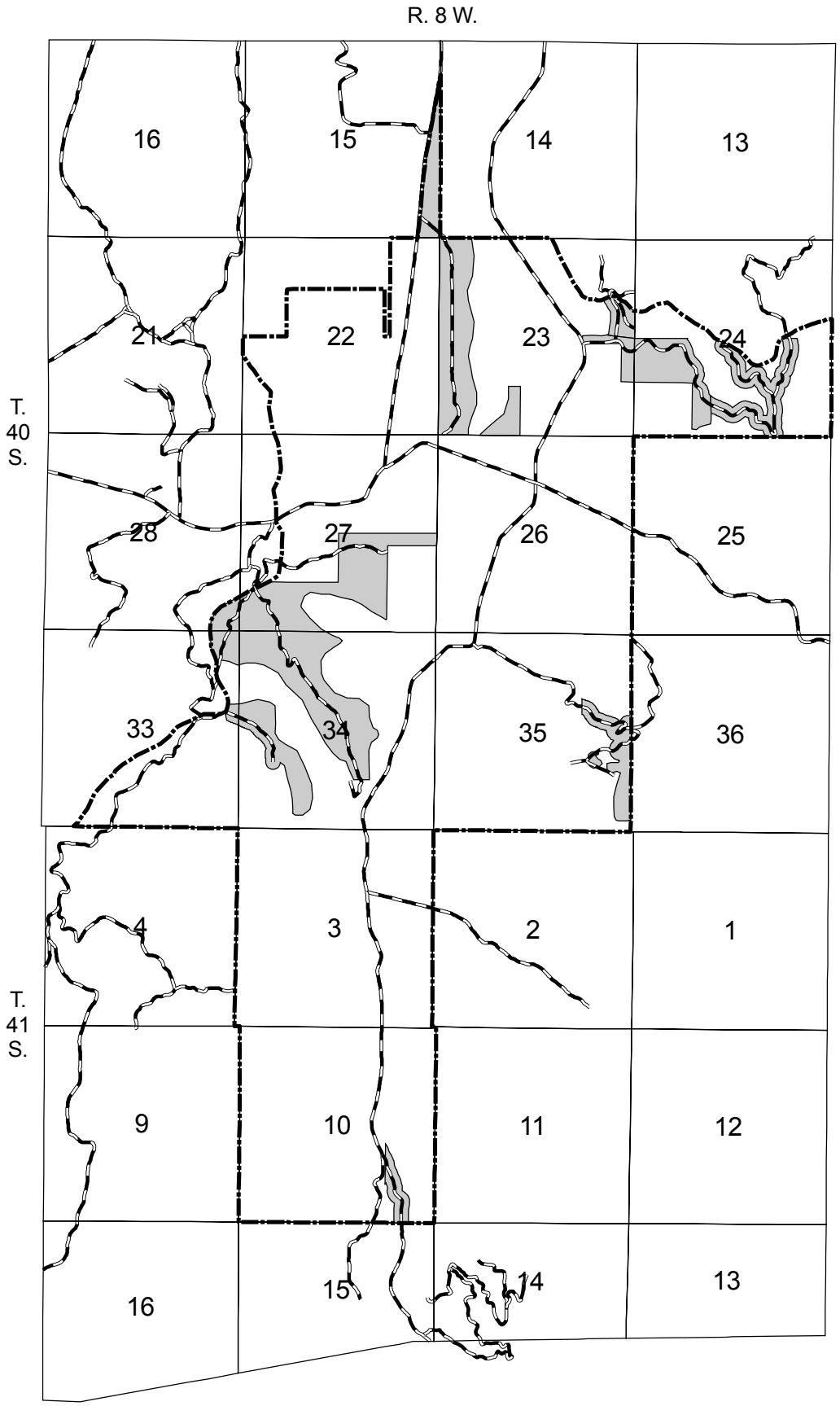
# East Illinois Landscape Management Project




Potential Biomass Utilization Area

Project Boundary

Scale: 1.25 inches = 1 mile

## Map 6 - Potential Biomass Utilization



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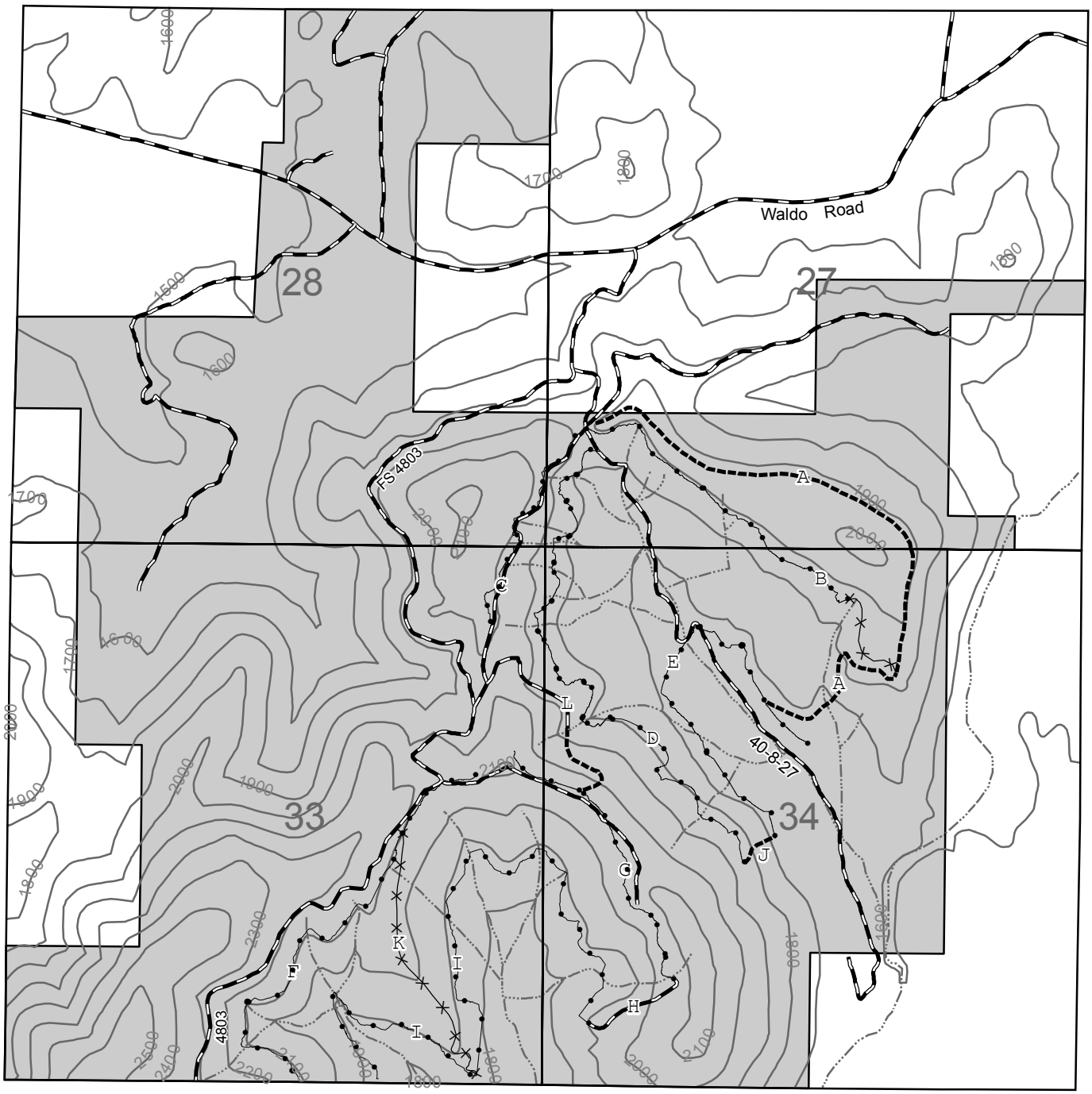
Prepared by: jmcgloth
Creation Date: 3/28/2006 3:05:17 PM
Machine: ILMORMD40481674

# East Fort Illinois Landscape Management Project

R. 8 W.




T. 40 S.

Scale: 3.5 inches = 1 mile
Contour Interval = 100 feet

## Map 7 - Proposed Trails

BLM | Existing Road | Existing Trail | Proposed Trail | Existing Ditch



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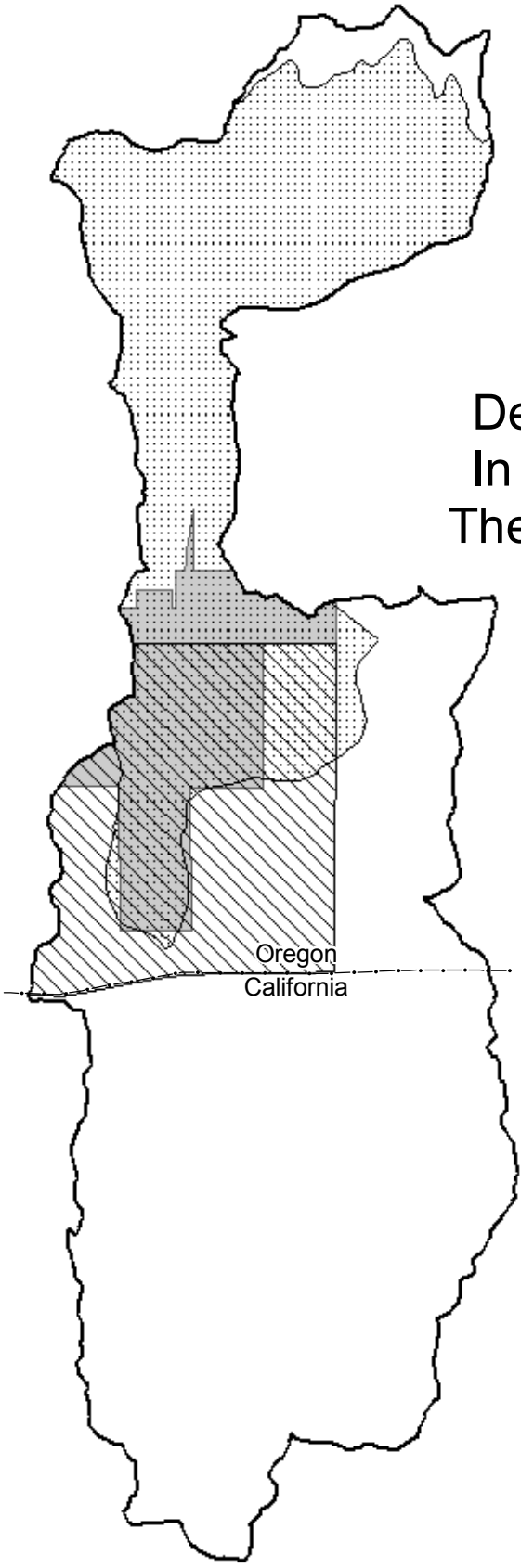
Creation Date: 1/23/2006 9:03:44 AM
Machine: ILMORMD40481674

# East Illinois Landscape Management Project




## Map 8

## Deer & Elk Winter Range In The Oregon Portion Of The East Illinois Watershed

N

Deer Winter Range

Elk Winter Range

Project Area

Watershed Boundary

Scale: .4 inches = 1 mile



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# Appendix B. Unit Treatments

## *Table B-1 Alternative 2 East Fork Illinois*

| *T-R-S-OI#* | *Land Use Allocation* | *Acres* | *Seral Stage Current* | *Plant Series* | *Vegetation Treatment* | *Understory Fuels Treatments* | *Logging_ System* | *Total Unit Volume (mbf/ac)* | *Matrix Harvest Acres* | *Matrix Harvest Volume (mbf/ac)* | *Riparian Harvest Acres* | *Riparian Harvest Volume (mbf/ac)* | *Total Harvest (mbf)* | *Non Harvest Treatment Acres Riparian* | *Non Harvest Treatment Acres Matrix* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40S-08W-15-002 | Matrix | 19 | Mid | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 19 | |
| 40S-08W-15-006 | Matrix | 16 | Mature | DF | DM/ModGS | SL/HP/UB | Tractor | | 16 | 3 | | | 48 | | |
| 40S-08W-22-002 | Matrix | 43 | Mid | JP | WHRE | SL/HP/BB | | | | | | | | 41 | 2 |
| 40S-08W-23-001 | Matrix\ Riparian | 5 | Mid | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 2 | 3 |
| 40S-08W-23-002 | Matrix\ Riparian | 40 | Mid | WO | No Treatment | | | | | | | | | | |
| 40S-08W-23-003 | Matrix\ Riparian | 25 | Mature | DF | DM/ModGS | SL/HP/UB | Tractor | | 16 | 3 | 9 | 3 | 75 | | |
| 40S-08W-23-004 | Matrix\ Riparian | 9 | Mid | WO | No Treatment | | | | | | | | | | |
| 40S-08W-23-005 | Matrix\ Riparian | 13 | Mid | WO | No Treatment | | | | | | | | | | |
| 40S-08W-23-006 | Matrix | 13 | Early | WO | WHRE | SL/HP/BB | | | | | | | | 13 | |
| 40S-08W-23-007 | Matrix\ Riparian | 15 | Mid | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 6 | 9 |
| 40S-08W-23-008 | Matrix | 13 | Mid | WO | WHRE | SL/HP/BB | | | | | | | | 13 | |
| 40S-08W-23-009A | Matrix | 7 | Mid | WO | WHRE | SL/HP/BB | | | | | | | | 4 | 3 |
| 40S-08W-23-009B | Matrix\ Riparian | 5 | Mid | DF | Restoration Thinning | SL/HP/UB | Tractor | | 2 | 2 | 3 | 1 | 7 | | |
| 40S-08W-23-011A | Matrix | 9 | Mature | DF | DM/ModGS | SL/HP/UB | Tractor | | 9 | 3 | | | 27 | | |

## *Table B-1 Alternative 2 East Fork Illinois*

| *T-R-S-OI#* | *Land Use Allocation* | *Acres* | *Seral Stage* | *Plant Series* | *Vegetation Treatment* | *Understory Fuels* | *Logging_ System* | *Total Unit Volume* | *Matrix Harvest* | *Matrix Harvest* | *Riparian Harvest* | *Riparian Harvest* | *Total Harvest* | *Non Harvest Treatment Acres* | *Non Harvest Treatment Acres* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| | | Current | | | Treatments | | (mbf/ac) | Acres | Volume (mbf/ac) | Acres | Volume (mbf/ac) | (mbf) | Riparian | Matrix |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40S-08W-23-011B | Matrix | 6 | Mature | DF | DM/ModGS | SL/HP/UB | Cable | | 6 | 3 | | | 18 | | |
| 40S-08W-23-012 | Matrix | 12 | Mature | DF | DM/ModGS | SL/HP/UB | Tractor | | 12 | 8 | | | 96 | | |
| 40S-08W-23-014 | Matrix | 15 | Early | DF | Young Stand Management | PCT/BR/HP | | | | | | | | 9 | 6 |
| 40S-08W-23-015 | Matrix | 7 | Early | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 7 | |
| 40S-08W-23-016 | Matrix | 4 | Early | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 4 | |
| 40S-08W-23-017 | Matrix | 8 | Mature | DF | DM/ModGS | SL/HP/UB | Tractor | | 8 | 3 | | | 24 | | |
| 40S-08W-23-018 | Matrix\ Riparian | 42 | Mature | DF | DM/ModGS | SL/HP/UB | Tractor | | 38 | 3 | 4 | 2 | 122 | | |
| 40S-08W-23-019 | Matrix\ Riparian | 6 | Mature | DF | DM/ModGS | SL/HP/UB | Tractor | | 1 | 5 | 5 | 3 | 20 | | |
| 40S-08W-24-001 | Matrix | 5 | Mature | JP | WHRE | SL/HP/BB | | | | | | | | 5 | |
| 40S-08W-24-002A | Matrix\ Riparian | 99 | Mature | DF | DM/ModGS | SL/HP/UB | Tractor/Cable | | 71 | 10 | 28 | 5 | 850 | | |
| 40S-08W-24-002B | Matrix | 2 | Mature | DF | DM/ModGS | SL/HP/UB | Tractor | | 2 | 7 | | | 14 | | |
| 40S-08W-24-002C | Matrix | 4 | Mid | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 4 | |
| 40S-08W-24-003 | Matrix\ Riparian | 24 | Mature | JP | WHRE | SL/HP/BB | | | | | | | | 11 | 13 |
| 40S-08W-24-004 | Matrix\ Riparian | 31 | Mature | JP | WHRE | SL/HP/BB | | | | | | | | 30 | 1 |

# Table B-1 Alternative 2 East Fork Illinois

| T-R-S-OI# | Land Use Allocation | Acres | Seral Stage Current | Plant Series | Vegetation Treatment | Understory Fuels Treatments | Logging_ System | Total Unit Volume (mbf/ac) | Matrix Harvest Acres | Matrix Harvest Volume (mbf/ac) | Riparian Harvest Acres | Riparian Harvest Volume (mbf/ac) | Total Harvest (mbf) | Non Harvest Treatment Acres Riparian | Non Harvest Treatment Acres Matrix |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40S-08W-24-005 | Matrix | 14 | Mature | DF | CT | SL/HP/UB | Tractor/Cable | | 14 | 10 | | | 140 | | |
| 40S-08W-24-006 | Matrix | 31 | Early | DF | Young Stand Management | PCT/BR | | | | | | | | 26 | 5 |
| 40S-08W-24-007A | Matrix\ Riparian | 18 | Mature | DF | CT | SL/HP/UB | Tractor/Cable | | 13 | 10 | 5 | 5 | 155 | | |
| 40S-08W-24-007B | Matrix\ Riparian | 19 | Mature | DF | Restoration Thinning | SL/HP/UB | Tractor/Cable | | 7 | 2 | 12 | 1 | 26 | | |
| 40S-08W-24-008 | Matrix\ Riparian | 6 | Early | WO | WHRE | SL/HP/BB | | | | | | | | 2 | 4 |
| 40S-08W-24-009 | Matrix | 2 | Early | WO | WHRE | SL/HP/BB | | | | | | | | 1 | 1 |
| 40S-08W-26-001 | Matrix | 29 | Late | TO | DM/ModGS | SL/HP/UB | Heli | | 21 | 10 | 8 | 5 | 250 | | |
| 40S-08W-26-002 | Matrix | 12 | Mature | DF | DM/ModGS | SL/HP/UB | Heli | | 12 | 10 | | | 120 | | |
| 40S-08W-27-001 | Matrix\ Riparian | 3 | Early | WO | No Treatment | | | | | | | | | | |
| 40S-08W-27-002 | Matrix\ Riparian | 18 | Mid | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 16 | 2 |
| 40S-08W-27-003 | Matrix | 51 | Late | DF | DM/ModGS | SL/HP/UB | Heli | | 51 | 8 | | | 408 | | |
| 40S-08W-27-004 | Matrix\ Riparian | 5 | Early | WO | No Treatment | | | | | | | | | | |
| 40S-08W-27-005 | Matrix\ Riparian | 46 | Mid | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 28 | 18 |
| 40S-08W-27-006 | Matrix\ Riparian | 12 | Mature | TO | DM/ModGS | SL/HP/UB | Tractor/Heli | | 7 | 10 | 5 | 5 | 95 | | |

# Table B-1 Alternative 2 East Fork Illinois

| T-R-S-OI# | Land Use Allocation | Acres | Seral Stage Current | Plant Series | Vegetation Treatment | Understory Fuels Treatments | Logging_ System | Total Unit Volume (mbf/ac) | Matrix Harvest Acres | Matrix Harvest Volume (mbf/ac) | Riparian Harvest Acres | Riparian Harvest Volume (mbf/ac) | Total Harvest (mbf) | Non Harvest Treatment Acres Riparian | Non Harvest Treatment Acres Matrix |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40S-08W-27-007 | Matrix\ Riparian | 2 | Mid | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 2 | |
| 40S-08W-27-008 | Matrix | 9 | Early | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 8 | 1 |
| 40S-08W-27-009 | Matrix | 27 | Early | WO | WHRE | SL/HP/BB | | | | | | | | 19 | 8 |
| 40S-08W-28-007 | Matrix | 12 | Mature | TO | DM/ModGS | SL/HP/UB | Tractor/Heli | | 12 | 10 | | | 120 | | |
| 40S-08W-33-001 | Matrix | 9 | Mature | DF | DM/ModGS | SL/HP/UB | Tractor/Heli | | 4 | 8 | 5 | 4 | 52 | | |
| 40S-08W-33-002A | Matrix\ Riparian | 124 | Mid | JP | WHRE | SL/HP/BB | | | | | | | | 87 | 37 |
| 40S-08W-33-002B | Matrix | 8 | Mid | JP | WHRE | SL/HP/BB | | | | | | | | 8 | |
| 40S-08W-33-005 | Matrix | 6 | Mid | DF | Restoration Thinning | SL/HP/UB | Tractor | | 5 | 2 | 1 | 1 | 11 | | |
| 40S-08W-33-006 | Matrix\ Riparian | 21 | Late | DF | DM/ModGS | HP/UB | Heli | | 16 | 6 | 5 | 3 | 111 | | |
| 40S-08W-33-007A | Matrix\ Riparian | 33 | Mid | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 18 | 15 |
| 40S-08W-33-007B | Matrix\ Riparian | 16 | Late | DF | DM/ModGS | SL/HP/UB | Heli | | 12 | 6 | 4 | 3 | 84 | | |
| 40S-08W-33-008 | Matrix\ Riparian | 17 | Mid | DF | Restoration Thinning | SL/HP/UB | Heli | | 3 | 3 | 14 | 2 | 37 | | |
| 40S-08W-33-009 | Matrix | 7 | Mid | JP | WHRE | SL/HP/BB | | | | | | | | 4 | 3 |
| 40S-08W-34-001A | Matrix\ Riparian | 78 | Mid | DF | Restoration Thinning | SL/HP/UB | Tractor | | 37 | 2 | 41 | 1 | 115 | | |

# Table B-1 Alternative 2 East Fork Illinois

| T-R-S-OI# | Land Use Allocation | Acres | Seral Stage Current | Plant Series | Vegetation Treatment | Understory Fuels Treatments | Logging_ System | Total Unit Volume (mbf/ac) | Matrix Harvest Acres | Matrix Harvest Volume (mbf/ac) | Riparian Harvest Acres | Riparian Harvest Volume (mbf/ac) | Total Harvest (mbf) | Non Harvest Treatment Acres Riparian | Non Harvest Treatment Acres Matrix |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40S-08W-34-001B | Matrix\ Riparian | 39 | Mid | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 27 | 12 |
| 40S-08W-34-002 | Matrix\ Riparian | 23 | Mature | DF | DM/ModGS | HP/UB | Heli | | 20 | 10 | 3 | 5 | 215 | | |
| 40S-08W-34-003 | Matrix\ Riparian | 51 | Mature | TO | DM/ModGS | SL/HP/UB | Tractor/Heli | | 39 | 10 | 12 | 5 | 450 | | |
| 40S-08W-34-004 | Matrix\ Riparian | 29 | Mature | DF | DM/ModGS | SL/HP/UB | Tractor | | 18 | 8 | 11 | 4 | 188 | | |
| 40S-08W-34-005 | Matrix\ Riparian | 16 | Early | WO | No Treatment | | | | | | | | | | |
| 40S-08W-34-006 | Matrix | 35 | Mid | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 31 | 4 |
| 40S-08W-34-007 | Matrix | 18 | Mid | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 11 | 7 |
| 40S-08W-34-008 | Matrix\ Riparian | 5 | Mid | WO | WHRE | SL/HP/BB | | | | | | | | 4 | 1 |
| 40S-08W-34-009 | Matrix | 5 | Mid | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 1 | 4 |
| 40S-08W-34-010A | Matrix | 75 | Late | TO | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 59 | 16 |
| 40S-08W-34-010B | Matrix | 13 | Mid | DF | Restoration Thinning | SL/HP/UB | Tractor | | 13 | 2 | | | 26 | | |
| 40S-08W-34-011 | Matrix | 62 | Late | DF | DM/ModGS | SL/HP/UB | Cable/Heli | | 58 | 10 | 4 | 5 | 600 | | |
| 40S-08W-35-001 | Matrix\ Riparian | 85 | Mature | DF | DM/ModGS | SL/HP/UB | T/Cable/ Heli | | 53 | 8 | 32 | 4 | 552 | | |
| 40S-08W-35-002 | Matrix\ Riparian | 17 | Mature | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 11 | 6 |

## Table B-1 Alternative 2 East Fork Illinois

| T-R-S-OI# | Land Use Allocation | Acres | Seral Stage Current | Plant Series | Vegetation Treatment | Understory Fuels Treatments | Logging_ System | Total Unit Volume (mbf/ac) | Matrix Harvest Acres | Matrix Harvest Volume (mbf/ac) | Riparian Harvest Acres | Riparian Harvest Volume (mbf/ac) | Total Harvest (mbf) | Non Harvest Treatment Acres Riparian | Non Harvest Treatment Acres Matrix |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40S-08W-35-003 | Matrix\ Riparian | 24 | Mature | DF | DM/ModGS | SL/HP/UB | Heli | | 22 | 8 | 2 | 4 | 184 | | |
| 40S-08W-35-004A | Matrix\ Riparian | 85 | Mid | JP | WHRE | SL/HP/BB | | | | | | | | 60 | 25 |
| 40S-08W-35-004B | Matrix\ Riparian | 11 | Mature | DF | Restoration Thinning | SL/HP/UB | Heli | | 5 | 2 | 6 | 1 | 16 | | |
| 40S-08W-35-005 | Matrix | 22 | Mature | DF | Restoration Thinning | SL/HP/UB | Tractor | | 19 | 2 | 3 | 1 | 41 | | |
| 41S-08W-10-001 | Matrix | 3 | Early | WO | WHRE | BB | | | | | | | | 2 | 1 |
| 41S-08W-10-002 | Matrix\ Riparian | 4 | Early | DF | No Treatment | | | | | | | | | | |
| 41S-08W-10-003A | Matrix | 10 | Mature | DF | CT | SL/HP/UB | Heli | | 10 | 8 | | | 80 | | |
| 41S-08W-10-003B | Matrix\ Riparian | 45 | Mature | DF | DM/ModGS | SL/HP/UB | Heli | | 22 | 4 | 23 | 2 | 134 | | |
| 41S-08W-10-003C | Matrix\ Riparian | 19 | Mature | DF | CT | HP | Heli | | 9 | 8 | 10 | 4 | 112 | | |
| 41S-08W-3-001A | Matrix\ Riparian | 69 | Mid | JP | WHRE | SL/HP/BB | | | | | | | | 47 | 22 |
| 41S-08W-3-001B | Matrix\ Riparian | 7 | Mature | DF | No Treatment | | | | | | | | | | |
| 41S-08W-3-002 | Matrix\ Riparian | 6 | Late | DF | No Treatment | | | | | | | | | | |
| **Totals** | | **1910** | | | | | | | **683** | | **255** | | **5623** | **229** | **640** |

## Table B-2 Alternative 3 East Fork Illinois

| T-R-S-OI# | Land Use Allocation | Acres | Seral Stage Current | Plant Series | Vegetation Treatment | Understory Fuels Treatments | Logging_ System | Total Unit Volume (mbf/ac) | Matrix Harvest Acres | Matrix Harvest Volume (mbf/ac) | Riparian Harvest Acres | Riparian Harvest Volume (mbf/ac) | Total Harvest (mbf) | Non Harvest Treatment Acres Riparian | Non Harvest Treatment Acres Matrix |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40S-08W-15-002 | Matrix | 19 | Mid | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | | 19 |
| 40S-08W-15-006 | Matrix | 16 | Mature | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | | 16 |
| 40S-08W-22-002 | Matrix | 43 | Mid | JP | WHRE | SL/HP/BB | | | | | | | | 2 | 41 |
| 40S-08W-23-001 | Matrix\ Riparian | 5 | Mid | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 3 | 2 |
| 40S-08W-23-002 | Matrix\ Riparian | 40 | Mid | WO | No Treatment | | | | | | | | | | |
| 40S-08W-23-003 | Matrix\ Riparian | 25 | Mature | DF | Selective Cut | SL/HP/UB | Tractor | | 16 | 0.5 | | | 8 | 9 | |
| 40S-08W-23-004 | Matrix\ Riparian | 9 | Mid | WO | No Treatment | | | | | | | | | | |
| 40S-08W-23-005 | Matrix\ Riparian | 13 | Mid | WO | No Treatment | | | | | | | | | | |
| 40S-08W-23-006 | Matrix | 13 | Early | WO | WHRE | SL/HP/BB | | | | | | | | | 13 |
| 40S-08W-23-007 | Matrix\ Riparian | 15 | Mid | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 9 | 6 |
| 40S-08W-23-008 | Matrix | 13 | Mid | WO | WHRE | SL/HP/BB | | | | | | | | | 13 |
| 40S-08W-23-009A | Matrix | 7 | Mid | WO | WHRE | SL/HP/BB | | | | | | | | 3 | 4 |
| 40S-08W-23-009B | Matrix\ Riparian | 5 | Mid | DF | Restoration Thinning | SL/HP/UB | Tractor | | 2 | 0.25 | | | 0.5 | | |
| 40S-08W-23-011A | Matrix | 9 | Mature | DF | Selective Cut | SL/HP/UB | Tractor | | 9 | 0.5 | | | 4.5 | | |

# Table B-2 Alternative 3 East Fork Illinois

| T-R-S-OI# | Land Use Allocation | Acres | Seral Stage Current | Plant Series | Vegetation Treatment | Understory Fuels Treatments | Logging_ System | Total Unit Volume (mbf/ac) | Matrix Harvest Acres | Matrix Harvest Volume (mbf/ac) | Riparian Harvest Acres | Riparian Harvest Volume (mbf/ac) | Total Harvest (mbf) | Non Harvest Treatment Acres Riparian | Non Harvest Treatment Acres Matrix |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40S-08W-23-011B | Matrix | 6 | Mature | DF | Selective Cut | SL/HP/UB | Cable | | 6 | 0.5 | | | 3 | | |
| 40S-08W-23-012 | Matrix | 12 | Mature | DF | Selective Cut | SL/HP/UB | Tractor | | 12 | 0.5 | | | 6 | | |
| 40S-08W-23-014 | Matrix | 15 | Early | DF | Young Stand Management | PCT/BR/HP | | | | | | | | 6 | 9 |
| 40S-08W-23-015 | Matrix | 7 | Early | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | | 7 |
| 40S-08W-23-016 | Matrix | 4 | Early | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | | 4 |
| 40S-08W-23-017 | Matrix | 8 | Mature | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | | 8 |
| 40S-08W-23-018 | Matrix\ Riparian | 42 | Mature | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 4 | 38 |
| 40S-08W-23-019 | Matrix\ Riparian | 6 | Mature | DF | Selective Cut | SL/HP/UB | Tractor | | 1 | 0.5 | | | 0.5 | 5 | |
| 40S-08W-24-001 | Matrix | 5 | Mature | JP | No Treatment | | | | | | | | | | |
| 40S-08W-24-002A | Matrix\ Riparian | 99 | Mature | DF | Selective Cut | SL/HP/UB | Tractor/Cable | | 71 | 0.5 | | | 35.5 | 28 | |
| 40S-08W-24-002B | Matrix | 2 | Mature | DF | Selective Cut | SL/HP/UB | Tractor | | 2 | 0.5 | | | 1 | | |
| 40S-08W-24-002C | Matrix | 4 | Mid | DF | No Treatment | | | | | | | | | | |
| 40S-08W-24-003 | Matrix\ Riparian | 24 | Mature | JP | No Treatment | | | | | | | | | | |
| 40S-08W-24-004 | Matrix\ Riparian | 31 | Mature | JP | No Treatment | | | | | | | | | | |

# Table B-2 Alternative 3 East Fork Illinois

| T-R-S-OI# | Land Use Allocation | Acres | Seral Stage Current | Plant Series | Vegetation Treatment | Understory Fuels Treatments | Logging_ System | Total Unit Volume (mbf/ac) | Matrix Harvest Acres | Matrix Harvest Volume (mbf/ac) | Riparian Harvest Acres | Riparian Harvest Volume (mbf/ac) | Total Harvest (mbf) | Non Harvest Treatment Acres Riparian | Non Harvest Treatment Acres Matrix |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40S-08W-24-005 | Matrix | 14 | Mature | DF | Selective Cut | SL/HP/UB | Tractor/Cable | | 14 | 0.5 | | | 7 | | |
| 40S-08W-24-006 | Matrix | 31 | Early | DF | Young Stand Management | PCT/BR | | | | | | | | 5 | 26 |
| 40S-08W-24-007A | Matrix\ Riparian | 18 | Mature | DF | Selective Cut | SL/HP/UB | Tractor/Cable | | 13 | 0.5 | | | 6.5 | 5 | |
| 40S-08W-24-007B | Matrix\ Riparian | 19 | Mature | DF | Restoration Thinning | SL/HP/UB | Tractor/Cable | | 7 | 0.25 | | | 1.8 | | |
| 40S-08W-24-008 | Matrix\ Riparian | 6 | Early | WO | No Treatment | | | | | | | | | | |
| 40S-08W-24-009 | Matrix | 2 | Early | WO | WHRE | SL/HP/BB | | | | | | | | 1 | 1 |
| 40S-08W-26-001 | Matrix | 29 | Late | TO | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 8 | 21 |
| 40S-08W-26-002 | Matrix | 12 | Mature | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | | 12 |
| 40S-08W-27-001 | Matrix\ Riparian | 3 | Early | WO | No Treatment | | | | | | | | | | |
| 40S-08W-27-002 | Matrix\ Riparian | 18 | Mid | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 2 | 16 |
| 40S-08W-27-003 | Matrix | 51 | Late | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | | 51 |
| 40S-08W-27-004 | Matrix\ Riparian | 5 | Early | WO | No Treatment | | | | | | | | | | |
| 40S-08W-27-005 | Matrix\ Riparian | 46 | Mid | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 18 | 28 |
| 40S-08W-27-006 | Matrix\ Riparian | 12 | Mature | TO | Selective Cut | SL/HP/UB | Tractor | | 2 | 0.5 | | | 1 | 5 | 5 |

# Table B-2 Alternative 3 East Fork Illinois

| T-R-S-OI# | Land Use Allocation | Acres | Seral Stage Current | Plant Series | Vegetation Treatment | Understory Fuels Treatments | Logging_ System | Total Unit Volume (mbf/ac) | Matrix Harvest Acres | Matrix Harvest Volume (mbf/ac) | Riparian Harvest Acres | Riparian Harvest Volume (mbf/ac) | Total Harvest (mbf) | Non Harvest Treatment Acres Riparian | Non Harvest Treatment Acres Matrix |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40S-08W-27-007 | Matrix\ Riparian | 2 | Mid | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | | 2 |
| 40S-08W-27-008 | Matrix | 9 | Early | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 1 | 8 |
| 40S-08W-27-009 | Matrix | 27 | Early | WO | WHRE | SL/HP/BB | | | | | | | | 8 | 19 |
| 40S-08W-28-007 | Matrix | 12 | Mature | TO | Selective Cut | SL/HP/UB | Tractor | | 3 | 0.5 | | | 1.5 | | 9 |
| 40S-08W-33-001 | Matrix | 9 | Mature | DF | Selective Cut | SL/HP/UB | Tractor | | 2 | 0.5 | | | 1 | 5 | 2 |
| 40S-08W-33-002A | Matrix\ Riparian | 124 | Mid | JP | WHRE/No Treatment | SL/HP/BB | | | | | | | | | 31 |
| 40S-08W-33-002B | Matrix | 8 | Mid | JP | No Treatment | | | | | | | | | | |
| 40S-08W-33-005 | Matrix | 6 | Mid | DF | No Treatment | | | | | | | | | | |
| 40S-08W-33-006 | Matrix\ Riparian | 21 | Late | DF | No Treatment | | | | | | | | | | |
| 40S-08W-33-007A | Matrix\ Riparian | 33 | Mid | DF | FHR/No Treatment | SL/HP/UB | | | | | | | | | 8 |
| 40S-08W-33-007B | Matrix\ Riparian | 16 | Late | DF | No Treatment | | | | | | | | | | |
| 40S-08W-33-008 | Matrix\ Riparian | 17 | Mid | DF | No Treatment | | | | | | | | | | |
| 40S-08W-33-009 | Matrix | 7 | Mid | JP | WHRE | SL/HP/BB | | | | | | | | 3 | 4 |
| 40S-08W-34-001A | Matrix\ Riparian | 78 | Mid | DF | Restoration Thinning | SL/HP/UB | Heli | | 37 | 0.25 | | | 9.3 | | |

# Table B-2 Alternative 3 East Fork Illinois

| T-R-S-OI# | Land Use Allocation | Acres | Seral Stage Current | Plant Series | Vegetation Treatment | Understory Fuels Treatments | Logging_ System | Total Unit Volume (mbf/ac) | Matrix Harvest Acres | Matrix Harvest Volume (mbf/ac) | Riparian Harvest Acres | Riparian Harvest Volume (mbf/ac) | Total Harvest (mbf) | Non Harvest Treatment Acres Riparian | Non Harvest Treatment Acres Matrix |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40S-08W-34-001B | Matrix\ Riparian | 39 | Mid | DF | FHR/No Treatment | SL/HP/UB | | | | | | | | 12 | 22 |
| 40S-08W-34-002 | Matrix\ Riparian | 23 | Mature | DF | FHR/No Treatment | SL/HP/UB | | | | | | | | 3 | 20 |
| 40S-08W-34-003 | Matrix\ Riparian | 51 | Mature | TO | Selective Cut | SL/HP/UB | Tractor | | 15 | 0.5 | | | 7.5 | 12 | 24 |
| 40S-08W-34-004 | Matrix\ Riparian | 29 | Mature | DF | Selective Cut | SL/HP/UB | Tractor | | 18 | 0.5 | | | 9 | 11 | |
| 40S-08W-34-005 | Matrix\ Riparian | 16 | Early | WO | No Treatment | | | | | | | | | | |
| 40S-08W-34-006 | Matrix | 35 | Mid | DF | FHR/No Treatment | SL/HP/UB | | | | | | | | | 16 |
| 40S-08W-34-007 | Matrix | 18 | Mid | DF | No Treatment | | | | | | | | | | |
| 40S-08W-34-008 | Matrix\ Riparian | 5 | Mid | WO | No Treatment | | | | | | | | | | |
| 40S-08W-34-009 | Matrix | 5 | Mid | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 4 | 1 |
| 40S-08W-34-010A | Matrix | 75 | Late | TO | FHR/No Treatment | SL/HP/UB | | | | | | | | | 4 |
| 40S-08W-34-010B | Matrix | 13 | Mid | DF | Restoration Thinning | SL/HP/UB | Tractor | | 13 | 0.25 | | | 3.3 | | |
| 40S-08W-34-011 | Matrix | 62 | Late | DF | Selective Cut | SL/HP/UB | Cable | | 6 | 0.5 | | | 3 | 4 | 52 |
| 40S-08W-35-001 | Matrix\ Riparian | 85 | Mature | DF | Selective Cut | SL/HP/UB | T/Cable | | 10 | 0.5 | | | 5 | 32 | 43 |
| 40S-08W-35-002 | Matrix\ Riparian | 17 | Mature | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 6 | 11 |

## Table B-2 Alternative 3 East Fork Illinois

| T-R-S-OI# | Land Use Allocation | Acres | Seral Stage Current | Plant Series | Vegetation Treatment | Understory Fuels Treatments | Logging_ System | Total Unit Volume (mbf/ac) | Matrix Harvest Acres | Matrix Harvest Volume (mbf/ac) | Riparian Harvest Acres | Riparian Harvest Volume (mbf/ac) | Total Harvest (mbf) | Non Harvest Treatment Acres Riparian | Non Harvest Treatment Acres Matrix |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40S-08W-35-003 | Matrix\ Riparian | 24 | Mature | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 2 | 22 |
| 40S-08W-35-004A | Matrix\ Riparian | 85 | Mid | JP | WHRE/No Treatment | SL/HP/BB | | | | | | | | 10 | 32 |
| 40S-08W-35-004B | Matrix\ Riparian | 11 | Mature | DF | Restoration Thinning | SL/HP/UB | Heli | | 5 | 0.25 | | | 1.3 | | |
| 40S-08W-35-005 | Matrix | 22 | Mature | DF | Restoration Thinning | SL/HP/UB | Tractor | | 19 | 0.25 | | | 4.8 | | |
| 41S-08W-10-001 | Matrix | 3 | Early | WO | WHRE | BB | | | | | | | | 1 | 2 |
| 41S-08W-10-002 | Matrix\ Riparian | 4 | Early | DF | No Treatment | | | | | | | | | | |
| 41S-08W-10-003A | Matrix | 10 | Mature | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | | 10 |
| 41S-08W-10-003B | Matrix\ Riparian | 45 | Mature | DF | Fuel Hazard Reduction | SL/HP/UB | | | | | | | | 23 | 22 |
| 41S-08W-10-003C | Matrix\ Riparian | 19 | Mature | DF | Fuel Hazard Reduction | SL/HP | | | | | | | | 10 | 9 |
| 41S-08W-3-001A | Matrix\ Riparian | 69 | Mid | JP | No Treatment | | | | | | | | | | |
| 41S-08W-3-001B | Matrix\ Riparian | 7 | Mature | DF | No Treatment | | | | | | | | | | |
| 41S-08W-3-002 | Matrix\ Riparian | 6 | Late | DF | No Treatment | | | | | | | | | | |
| **Totals** | | **1910** | | | | | | | **283** | | | | **121** | **260** | **713** |



## Table B-3 Alternative 4 East Fork Illinois

| T-R-S-OI# | Land Use Allocation | Acres | Seral Stage Current | Plant Series | Vegetation Treatment | Understory Fuels Treatments | Logging_ System | Total Unit Volume (mbf/ac) | Matrix Harvest Acres | Matrix Harvest Volume (mbf/ac) | Riparian Harvest Acres | Riparian Harvest Volume (mbf/ac) | Total Harvest (mbf) | Non Harvest Treatment Acres Riparian | Non Harvest Treatment Acres Matrix |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40S-08W-15-002 | Matrix | 19 | Mid | DF | Fuel Hazard Reduction | | | | | | | | | | 19 |
| 40S-08W-15-006 | Matrix | 16 | Mature | DF | Fuel Hazard Reduction | | | | | | | | | | 16 |
| 40S-08W-22-002 | Matrix | 43 | Mid | JP | WHRE | | | | | | | | | 2 | 41 |
| 40S-08W-23-001 | Matrix\ Riparian | 5 | Mid | DF | Fuel Hazard Reduction | | | | | | | | | 3 | 2 |
| 40S-08W-23-002 | Matrix\ Riparian | 40 | Mid | WO | No Treatment | | | | | | | | | | |
| 40S-08W-23-003 | Matrix\ Riparian | 25 | Mature | DF | DM | | Tractor | | 16 | 3 | 9 | 2 | 66 | | |
| 40S-08W-23-004 | Matrix\ Riparian | 9 | Mid | WO | No Treatment | | | | | | | | | | |
| 40S-08W-23-005 | Matrix\ Riparian | 13 | Mid | WO | No Treatment | | | | | | | | | | |
| 40S-08W-23-006 | Matrix | 13 | Early | WO | WHRE | | | | | | | | | | 13 |
| 40S-08W-23-007 | Matrix\ Riparian | 15 | Mid | DF | Fuel Hazard Reduction | | | | | | | | | 9 | 6 |
| 40S-08W-23-008 | Matrix | 13 | Mid | WO | WHRE | | | | | | | | | | 13 |
| 40S-08W-23-009A | Matrix | 7 | Mid | WO | WHRE | | | | | | | | | 3 | 4 |
| 40S-08W-23-009B | Matrix\ Riparian | 5 | Mid | DF | Restoration Thinning | | Tractor | | 2 | 2 | 3 | 1 | 7 | | |
| 40S-08W-23-011A | Matrix | 9 | Mature | DF | DM | | Tractor | | 9 | 3 | | | 27 | | |

# Table B-3 Alternative 4 East Fork Illinois

| T-R-S-OI# | Land Use Allocation | Acres | Seral Stage Current | Plant Series | Vegetation Treatment | Understory Fuels Treatments | Logging_ System | Total Unit Volume (mbf/ac) | Matrix Harvest Acres | Matrix Harvest Volume (mbf/ac) | Riparian Harvest Acres | Riparian Harvest Volume (mbf/ac) | Total Harvest (mbf) | Non Harvest Treatment Acres Riparian | Non Harvest Treatment Acres Matrix |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40S-08W-23-011B | Matrix | 6 | Mature | DF | DM | | Cable | | 6 | 3 | | | 18 | | |
| 40S-08W-23-012 | Matrix | 12 | Mature | DF | DM | | Tractor | | 12 | 4 | | | 48 | | |
| 40S-08W-23-014 | Matrix | 15 | Early | DF | Young Stand Management | | | | | | | | | 6 | 9 |
| 40S-08W-23-015 | Matrix | 7 | Early | DF | Fuel Hazard Reduction | | | | | | | | | | 7 |
| 40S-08W-23-016 | Matrix | 4 | Early | DF | Fuel Hazard Reduction | | | | | | | | | | 4 |
| 40S-08W-23-017 | Matrix | 8 | Mature | DF | Fuel Hazard Reduction | | | | | | | | | | 8 |
| 40S-08W-23-018 | Matrix\ Riparian | 42 | Mature | DF | Fuel Hazard Reduction | | | | | | | | | 4 | 38 |
| 40S-08W-23-019 | Matrix\ Riparian | 6 | Mature | DF | DM | | Tractor | | 1 | 3 | 5 | 2 | 13 | | |
| 40S-08W-24-001 | Matrix | 5 | Mature | JP | No Treatment | | | | | | | | | | |
| 40S-08W-24-002A | Matrix\ Riparian | 99 | Mature | DF | DM | | Tractor/Cable | | 71 | 5 | 28 | 2 | 411 | | |
| 40S-08W-24-002B | Matrix | 2 | Mature | DF | DM | | Tractor | | 2 | 3 | | | 6 | | |
| 40S-08W-24-002C | Matrix | 4 | Mid | DF | No Treatment | | | | | | | | | | |
| 40S-08W-24-003 | Matrix\ Riparian | 24 | Mature | JP | No Treatment | | | | | | | | | | |
| 40S-08W-24-004 | Matrix\ Riparian | 31 | Mature | JP | No Treatment | | | | | | | | | | |

# Table B-3 Alternative 4 East Fork Illinois

| T-R-S-OI# | Land Use Allocation | Acres | Seral Stage Current | Plant Series | Vegetation Treatment | Understory Fuels Treatments | Logging_ System | Total Unit Volume (mbf/ac) | Matrix Harvest Acres | Matrix Harvest Volume (mbf/ac) | Riparian Harvest Acres | Riparian Harvest Volume (mbf/ac) | Total Harvest (mbf) | Non Harvest Treatment Acres Riparian | Non Harvest Treatment Acres Matrix |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40S-08W-24-005 | Matrix | 14 | Mature | DF | DM | | Tractor/Cable | | 14 | 5 | | | 70 | | |
| 40S-08W-24-006 | Matrix | 31 | Early | DF | Young Stand Management | | | | | | | | | 5 | 26 |
| 40S-08W-24-007A | Matrix\ Riparian | 18 | Mature | DF | DM | | Tractor/Cable | | 13 | 5 | 5 | 2 | 75 | | |
| 40S-08W-24-007B | Matrix\ Riparian | 19 | Mature | DF | Restoration Thinning | | Tractor/Cable | | 7 | 2 | 12 | 1 | 26 | | |
| 40S-08W-24-008 | Matrix\ Riparian | 6 | Early | WO | No Treatment | | | | | | | | | | |
| 40S-08W-24-009 | Matrix | 2 | Early | WO | WHRE | | | | | | | | | 1 | 1 |
| 40S-08W-26-001 | Matrix | 29 | Late | TO | DM | | | | 21 | 5 | | | 105 | | |
| 40S-08W-26-002 | Matrix | 12 | Mature | DF | DM | | | | 12 | 5 | | | 60 | | |
| 40S-08W-27-001 | Matrix\ Riparian | 3 | Early | WO | No Treatment | | | | | | | | | | |
| 40S-08W-27-002 | Matrix\ Riparian | 18 | Mid | DF | Fuel Hazard Reduction | | | | | | | | | 2 | 16 |
| 40S-08W-27-003 | Matrix | 51 | Late | DF | DM | | | | 51 | 4 | | | 204 | | |
| 40S-08W-27-004 | Matrix\ Riparian | 5 | Early | WO | No Treatment | | | | | | | | | | |
| 40S-08W-27-005 | Matrix\ Riparian | 46 | Mid | DF | Fuel Hazard Reduction | | | | | | | | | 18 | 28 |
| 40S-08W-27-006 | Matrix\ Riparian | 12 | Mature | TO | DM | | Tractor | | 7 | 5 | | | 35 | | |

# Table B-3 Alternative 4 East Fork Illinois

| T-R-S-OI# | Land Use Allocation | Acres | Seral Stage Current | Plant Series | Vegetation Treatment | Understory Fuels Treatments | Logging_ System | Total Unit Volume (mbf/ac) | Matrix Harvest Acres | Matrix Harvest Volume (mbf/ac) | Riparian Harvest Acres | Riparian Harvest Volume (mbf/ac) | Total Harvest (mbf) | Non Harvest Treatment Acres Riparian | Non Harvest Treatment Acres Matrix |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40S-08W-27-007 | Matrix\ Riparian | 2 | Mid | DF | Fuel Hazard Reduction | | | | | | | | | | 2 |
| 40S-08W-27-008 | Matrix | 9 | Early | DF | Fuel Hazard Reduction | | | | | | | | | 1 | 8 |
| 40S-08W-27-009 | Matrix | 27 | Early | WO | WHRE | | | | | | | | | 8 | 19 |
| 40S-08W-28-007 | Matrix | 12 | Mature | TO | DM | | Tractor | | 12 | 5 | | | 60 | | |
| 40S-08W-33-001 | Matrix | 9 | Mature | DF | DM | | Tractor | | 4 | 4 | | | 16 | | |
| 40S-08W-33-002A | Matrix\ Riparian | 124 | Mid | JP | WHRE/No Treatment | | | | | | | | | | 31 |
| 40S-08W-33-002B | Matrix | 8 | Mid | JP | No Treatment | | | | | | | | | | |
| 40S-08W-33-005 | Matrix | 6 | Mid | DF | Restoration Thinning | | | | 5 | 2 | 1 | 1 | 11 | | |
| 40S-08W-33-006 | Matrix\ Riparian | 21 | Late | DF | DM | | | | 16 | 3 | | | 48 | | |
| 40S-08W-33-007A | Matrix\ Riparian | 33 | Mid | DF | FHR/No Treatment | | | | | | | | | | 8 |
| 40S-08W-33-007B | Matrix\ Riparian | 16 | Late | DF | DM | | | | 12 | 3 | | | 36 | | |
| 40S-08W-33-008 | Matrix\ Riparian | 17 | Mid | DF | Restoration Thinning | | | | 3 | 3 | 14 | 2 | 37 | | |
| 40S-08W-33-009 | Matrix | 7 | Mid | JP | WHRE | | | | | | | | | 3 | 4 |
| 40S-08W-34-001A | Matrix\ Riparian | 78 | Mid | DF | Restoration Thinning | | Heli | | 37 | 2 | 41 | 1 | 115 | | |

# Table B-3 Alternative 4 East Fork Illinois

| T-R-S-OI# | Land Use Allocation | Acres | Seral Stage Current | Plant Series | Vegetation Treatment | Understory Fuels Treatments | Logging_ System | Total Unit Volume (mbf/ac) | Matrix Harvest Acres | Matrix Harvest Volume (mbf/ac) | Riparian Harvest Acres | Riparian Harvest Volume (mbf/ac) | Total Harvest (mbf) | Non Harvest Treatment Acres Riparian | Non Harvest Treatment Acres Matrix |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40S-08W-34-001B | Matrix\ Riparian | 39 | Mid | DF | FHR/No Treatment | | | | | | | | | 12 | 22 |
| 40S-08W-34-002 | Matrix\ Riparian | 23 | Mature | DF | DM | | | | 20 | 5 | | | 100 | | |
| 40S-08W-34-003 | Matrix\ Riparian | 51 | Mature | TO | DM | | Tractor | | 39 | 5 | | | 195 | | |
| 40S-08W-34-004 | Matrix\ Riparian | 29 | Mature | DF | DM | | Tractor | | 18 | 4 | 11 | 2 | 94 | | |
| 40S-08W-34-005 | Matrix\ Riparian | 16 | Early | WO | No Treatment | | | | | | | | | | |
| 40S-08W-34-006 | Matrix | 35 | Mid | DF | FHR/No Treatment | | | | | | | | | | 16 |
| 40S-08W-34-007 | Matrix | 18 | Mid | DF | No Treatment | | | | | | | | | | |
| 40S-08W-34-008 | Matrix\ Riparian | 5 | Mid | WO | No Treatment | | | | | | | | | | |
| 40S-08W-34-009 | Matrix | 5 | Mid | DF | Fuel Hazard Reduction | | | | | | | | | 1 | 4 |
| 40S-08W-34-010A | Matrix | 75 | Late | TO | FHR/No Treatment | | | | | | | | | | 4 |
| 40S-08W-34-010B | Matrix | 13 | Mid | DF | Restoration Thinning | | Tractor | | 13 | 2 | | | 26 | | |
| 40S-08W-34-011 | Matrix | 62 | Late | DF | DM | | Cable | | 58 | 5 | | | 290 | | |
| 40S-08W-35-001 | Matrix\ Riparian | 85 | Mature | DF | DM | | T/Cable | | 53 | 4 | 32 | 2 | 276 | | |
| 40S-08W-35-002 | Matrix\ Riparian | 17 | Mature | DF | Fuel Hazard Reduction | | | | | | | | | 6 | 11 |

# Table B-3 Alternative 4 East Fork Illinois

| T-R-S-OI# | Land Use Allocation | Acres | Seral Stage Current | Plant Series | Vegetation Treatment | Understory Fuels Treatments | Logging_ System | Total Unit Volume (mbf/ac) | Matrix Harvest Acres | Matrix Harvest Volume (mbf/ac) | Riparian Harvest Acres | Riparian Harvest Volume (mbf/ac) | Total Harvest (mbf) | Non Harvest Treatment Acres Riparian | Non Harvest Treatment Acres Matrix |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40S-08W-35-003 | Matrix\ Riparian | 24 | Mature | DF | DM | | | | 22 | 4 | | | 88 | | |
| 40S-08W-35-004A | Matrix\ Riparian | 85 | Mid | JP | WHRE/No Treatment | | | | | | | | | 10 | 32 |
| 40S-08W-35-004B | Matrix\ Riparian | 11 | Mature | DF | Restoration Thinning | | Heli | | 5 | 2 | 6 | 1 | 16 | | |
| 40S-08W-35-005 | Matrix | 22 | Mature | DF | Restoration Thinning | | Tractor | | 19 | 2 | 3 | 1 | 41 | | |
| 41S-08W-10-001 | Matrix | 3 | Early | WO | WHRE | | | | | | | | | 1 | 2 |
| 41S-08W-10-002 | Matrix\ Riparian | 4 | Early | DF | No Treatment | | | | | | | | | | |
| 41S-08W-10-003A | Matrix | 10 | Mature | DF | DM | | | | 10 | 4 | | | 40 | | |
| 41S-08W-10-003B | Matrix\ Riparian | 45 | Mature | DF | DM | | | | 22 | 2 | 23 | 1 | 67 | | |
| 41S-08W-10-003C | Matrix\ Riparian | 19 | Mature | DF | DM | | | | 9 | 4 | 10 | 2 | 56 | | |
| 41S-08W-3-001A | Matrix\ Riparian | 69 | Mid | JP | No Treatment | | | | | | | | | | |
| 41S-08W-3-001B | Matrix\ Riparian | 7 | Mature | DF | No Treatment | | | | | | | | | | |
| 41S-08W-3-002 | Matrix\ Riparian | 6 | Late | DF | No Treatment | | | | | | | | | | |
| **Totals** | | **1910** | | | | | | | **621** | | **203** | | **2783** | **95** | **414** |

# Appendix C. Roads

| Road Number | Road Name | Road Miles | Control | Surface Type | Maint. Level | Maintenance | Construction | Renovation | Decommission | Road Closure Type | POC | PL | Reciprocal Agreement | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 S 08 W 15.00 | French Flat | 0.93 | BLM | NAT | 2 | 0.93 | | | | Existing Gate | No | No | No | |
| 40 S 08 W 15.01 | French Flat | 1.25 | BLM | NAT | 2 | 1.25 | | | | Existing Gate | No | No | No | |
| 40 S 08 W 23.00A | Little Elder Ml | 0.95 | BLM | ABC | 3 | 0.95 | | | | | No | No | No | |
| 40 S 08 W 23.00B | Little Elder Ml | 1.14 | BLM | ABC | 3 | 1.14 | | | | | No | No | No | |
| 40 S 08 W 23.01 | Little Elder A Sp | 0.52 | BLM | ABC | 3 | 0.52 | | | | | No | No | No | |
| 40 S 08 W 23.02 | Little Elder Sp | 0.25 | BLM | NAT | 2 | 0.25 | | | | | No | No | No | |
| 40 S 08 W 23.03 | Little Elder Sp | 0.12 | BLM | NAT | 2 | 0.12 | | | | | No | No | No | |
| 40 S 08 W 24.00A | Little Elder Sp | 0.35 | BLM | ABC | 2 | 0.35 | | | | | No | No | No | |
| 40 S 08 W 24.00B | Little Elder Sp | 0.77 | PVT | NAT | 2 | 0.77 | | | | | No | No | No | |
| SA 24 | Temporary Spur | 0.35 | BLM | NAT | 1 | 0.35 | 0.35 | | 0.35 | Const. Earth Barricade | No | No | No | Decommission after use |
| SB 24 | Temporary Spur | 0.11 | BLM | NAT | 1 | 0.11 | 0.11 | | 0.1 | Const. Earth Barricade | No | No | No | Decommission after use |
| 40 S 08 W 27.00 | Allen Gulch | 1.32 | BLM | NAT | 3 | 1.32 | | | | Existing Gate | No | No | Yes | Remove CMP, Install Low water Xing, replace two culverts , install cross drains |
| 40 S 08 W 27.01 | Allen Gulch | 0.47 | BLM | NAT | 1 | 0.47 | | 0.47 | 0.47 | Constr Earth Barricades | No | No | No | Road to become trail after treatment |
| 40 S 08 W 27.03 | Allen Gulch | 0.71 | PVT | NAT | 1 | 0.71 | | | | Constr Earth Barricade | No | No | Yes | |

| Road Number | Road Name | Road Miles | Control | Surface Type | Maint. Level | Maintenance | Construction | Renovation | Decommission | Road Closure Type | POC | PL | Reciprocal Agreement | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 S 08 W 33.00 | Allen Gulch | 0.39 | BLM | NAT | 1 | 0.39 | | 0.39 | | | No | No | No | |
| SA34 | Temporary Spur | 0.33 | BLM | NAT | 1 | 0.33 | 0.33 | | 0.33 | | No | No | No | Spur/Landing - Construct/Decommission |
| 40 S 08 W 35.00A | Sherman | 0.76 | PVT | NAT | 2 | 0.76 | | 0.76 | | | No | No | Yes | Replace major culvert |
| 40 S 08 W 35.00B | Sherman | 0.28 | BLM | NAT | 2 | 0.28 | | 0.28 | | Install Gate | No | No | Yes | Replace two bottom lay culverts, install cross drain culverts |
| 40 S 08 W 35.00C | Sherman | 0.01 | PVT | NAT | 2 | 0.01 | | 0.01 | | | No | No | Yes | Install cross drain culverts |
| 40 S 08 W 35.00D | Sherman | 0.19 | BLM | NAT | 2 | 0.19 | | 0.19 | | | No | No | Yes | |
| 40 S 09 W 35.01 | Sherman Spur | 0.25 | BLM | NAT | 1 | 0.25 | | | | | No | No | No | |
| 40 S 08 W 36.00 | Sherman II | 0.71 | PVT | NAT | 2 | 0.71 | 0.10 | 0.71 | | | No | No | No | Construct/Decommission Landing |
| FS 538 | Mackerel | 0.3 | Forest Service | NAT | 2 | 0.3 | | | | | No | No | No | |
| FS 032 | Scotch Gulch | 1.01 | Forest Service | NAT | 2 | 1.01 | | | | | No | No | No | Remove and Re-Install Trench Barricade |
| FS 4803 | Sanger Peak | 3.27 | Forest Service | NAT | 3 | 3.27 | | | | | No | No | No | |
| FS 4904 | Dunn Creek | 1.28 | Forest Service | NAT | 3 | 1.28 | | 1.28 | | | No | No | No | |
| FS 013 | Demonstration | 1 | Forest Service | NAT | 2 | 1 | | 1 | | | No | No | No | |
| FS 589 | Showroad | 0.26 | Forest Service | NAT | 2 | 0.26 | | 0.26 | | | No | No | No | Construct/Decommission Landing |
| TOTALS | | 19.28 | | | | 19.28 | 0.89 | 5.35 | 1.25 | | | | | |

## Appendix D. Fire and Fuels Definitions

Fire Regime

"Fire Regime" refers to the frequency, severity and extent of fires occurring in an area (Agee 1991). There are five national fire regimes (Schmidt et al. In press):

| | |
|---|---|
| Fire Regime 1: | 0-35 years, low severity |
| Fire Regime 2: | 0-35 years, high severity |
| Fire Regime 3: | 35-100+ years, mixed severity |
| Fire Regime 4: | 35-100+ years, high severity |
| Fire Regime 5: | 200+ years, high severity |

Fire Condition Class

FRCC 1 - Fire regimes are within or near an historic range. The risk of losing key ecosystem components is low. Vegetation species composition and structure are intact and functioning within an historical range.

FRCC 2 - Fire regimes have been moderately altered from their historical range (more than one return interval). This change results in moderate changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns.

FRCC 3 - Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. This change results in dramatic changes to fire size, frequency, severity, or landscape patterns.

Fire Behavior Fuel Models

*Shrub Group*

Fire Behavior Fuel Model 4 - High intensity and fast spreading fires involve the foliage and live and dead fine woody material in the crowns of a nearly continuous secondary overstory. Stands of mature shrubs, six feet tall or more are typical candidates. Besides flammable foliage, dead woody material in the stands contributes significantly to the fire intensity. A deep litter layer may also hamper suppression efforts.

Fire Behavior Fuel Model 5 - Fire is generally carried by surface fuels that are made up of litter cast by the shrubs and grasses or forbs in the understory. Fires typically have low intensities because the fuels are light and shrubs are young with little dead material. Young green stands with little dead wood would qualify.

Fire Behavior Fuel Model 6 - Fires carry through the shrub layer where the foliage is more flammable than fuel model 5, but requires moderate winds, greater than eight miles per hour.

Fire Behavior Fuel Model 7 - Fires burn through the surface and shrub strata equally and can occur at higher dead fuel moistures because of the flammability of live foliage and other live material.

*Timber Group*

Fire Behavior Fuel Model 8 - Slow burning ground fuels with low flame lengths are generally the case, although the fire may encounter small "jackpots" of heavier concentrations of fuels that can create a flare up. Only under severe weather conditions do the fuels pose a threat. Closed canopy stands of

short-needled conifers or hardwoods that have leafed out support fire in the compact litter layer. This layer is mostly twigs, needles, and leaves.

Fire Behavior Fuel Model 9 - Fires run through the surface faster than in fuel model 8 and have a longer flame length. Both long-needle pine and hardwood stands are typical. Concentrations of dead, down woody material will cause possible torching, spotting, and crowning of trees.

Fire Behavior Fuel Model 10 - Fires burn in the surface and ground fuels with greater intensity than the other timber litter types. A result of overmaturing and natural events creates a large load of heavy down, dead material on the forest floor. Crowning out, spotting, and torching of individual trees is more likely to occur, leading to potential fire control difficulties.

## Appendix E. Alternatives Considered but not Analyzed in Detail

1. Port Orford Cedar root rot – see discussion in Chapter 3, vegetation, affected environment, above (section 3.2.1)

2. Connectivity between lower and higher elevation forests – Given the level of agriculture and land development, and natural fragmentation because of serpentine soils, coupled with the small size of BLM managed lands, forest connectivity between low and high elevation forest, there is little opportunity for this project to improve connectivity.

3. Erosion of past hydraulic mining – While past mining scars continue to erode, restoration of these sites requires extensive, detailed engineering design and considerable earth movement. Such intensive projects do not easily fit within the purpose and need of this project and would be better served with individual consideration in a separate Environmental Assessment or Environmental Impact Statement.

4. The potential 70-acre old growth tanoak RNA (T34S, R8W section 34, unit 10A) is not currently being considered for RNA status. Historical land disturbance (mining and other cultural activities) in the area which has contributed to development of this stand to its current condition would likely preclude its designation as an RNA. However, the area is included in the potential RNA and would continue to be protected under the ACEC designation if it is approved in the RMP revision process. In any case, the East Fork project proposes to continue to protect this plant association in its current state. See details in Proposed Action and in Section 3.8 which addresses environmental impacts on the proposed ACEC.

5. During the scoping process the Takilma Watershed Committee, with support from community members, expressed interest in submitting an alternative that would be included in the EA. The project planning team considered the option of analyzing a citizen alternative. The team decided not to enter into a cooperative agreement to include the alternative in the EA but to instead consider it as public input along with all other comments and concerns received through the scoping process. After receiving *Alternative Five of the BLM East Fork Illinois Project* from the TWC, a core group of the BLM planning team met with representatives of the TWC three times, including a field visit to the project area. The objective of these meetings was to clarify the alternative and determine if it could be represented in an existing alternative of the EA. In the third meeting, the TWC subcommittee members were able to voice their concerns directly to the field manager. Alternative five was not incorporated into the EA as a stand alone alternative (this was discussed with the TWC). Their alternative was carefully analyzed and compared with alternative 3. As most of their alternative had been articulated during the scoping process, and alternative 3 was developed to address scoping comments from the community, evaluation of their alternative determined that all aspects that met the Purpose and Need of this EA had been incorporated into alternative 3. All other aspects of alternative five will be considered by the decision maker during development of the Decision Record for the project as part of scoping comments.

## Appendix F. Species and Habitats

**Spotted Owl Habitat McKelvey Rating System**

Operations Inventory polygons were given an owl habitat suitability rating (sometimes referred to as a McKelvey Rating) from 1 to 6.

The McKelvey Classification System is described below:

**Class 1** - Meets all life requirements (optimal). Nesting, foraging, roosting and dispersal. Canopy closure greater than 60 percent. Canopy structure usually multi-layered and diverse and includes snags, mixed species and large wolf trees.

**Class 2** - Meets foraging, dispersal, and roosting. Canopy closure greater than 60 percent. Open enough below canopy to permit flight. Canopies can be single layered.

Class 1 & 2 together are considered suitable owl habitat nesting, roosting and foraging (NRF).

**Class 3** - Meets no known requirements for spotted owls. Does not provide nesting, foraging, roosting, or dispersal. Canopy closure 40 percent or less. Does not meet requirements due to some kind of disturbance but has the biological potential to develop into class 1 or 2. This class includes clearcuts, plantations, thinned timber that could grow into suitable habitat given enough time.

**Class 4** - Meets no known requirements for spotted owls. Does not provide nesting, foraging, roosting or dispersal. Canopy closure 40 percent or less. Does not meet requirements due to site limitations and would not likely have the potential to develop into class 1 or 2. Examples could include oak woodlands, serpentine areas, etc. Other examples include roads, rockpits, brush fields, non forest, or very low stocking. To enable quantification and display of dispersal habitat, Class 5 was created as a subset of Class 3, and Class 6 was created as a subset of Class 4. These stands feature scattered clumps of cover that could offer short-term roosting cover to owls as they disperse across the landscape.

**Class 5** - Provides for spotted owl dispersal habitat only. Canopy closure between 40 and 60 percent. Needs to be open enough below canopy to allow for flight and avoidance of predators. Has the biological potential to develop into nesting, foraging or roosting habitat.

**Class 6** - Provides for spotted owl dispersal habitat only. Canopy closure between 40 and 60 percent. Needs to be open enough below canopy to allow for flight and avoidance of predators. Not currently meeting nesting, roosting or foraging requirements due to site limitations and would not likely have the potential to develop into class 1 or 2. Examples could include low site lands, woodlands, serpentine areas, etc.

**PROJECT NAME: East Fork Illinois Landscape Management Project**
**MIGRATORY BIRD SPECIES ASSESSMENT**
**Prepared by: Anthony Kerwin** **Date: March 23, 2006**

The following contains a list of Northern Pacific Forest Bird Conservation Region migratory birds that occur within the Grants Pass Resource Area (USFWS, 2002). Each of these species was considered and evaluated for this project. The following documents the basic conclusions of this assessment by species, and complies with the Migratory Bird Treaty Act and Executive Order 13186 to protect migratory birds. Two key principles of these are 1) focus on bird populations and their habitats rather than on species, and 2) focus conservation efforts on USFWS Birds of Conservation Concern.

| SPECIES[1] | PRESENCE[2] | BASIC CONCLUSION[3] |
|---|---|---|
| | | |
| Lewis's woodpecker | S | All snags >16" dbh will be reserved (EA pdfs, Section 2.4.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale. |
| Olive-sided flycatcher | S | All snags >16" dbh would be reserved (EA pdfs, Section 2.4.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale. |
| Rufous hummingbird | S | In fuels treatments, patches of untreated areas would be retained (Proposed Action section 2.2.1) as well as riparian areas and other buffers (i.e. botanical and wildlife buffers, cultural site buffers) would be left untreated (EA pdfs, Section 2.4). Ground disturbance from treatment activities and prescribed fire will stimulate growth of shrubs and herbaceous plants. Adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale. |
| Peregrine falcon | A | No habitat within the project area. |
| Flammulated owl | S | All snags >16" dbh will be reserved (EA pdfs, Section 2.4.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale. |
| White-headed woodpecker | S | All snags >16" dbh would be reserved (EA pdfs, Section 2.4.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale. |

[1] USFWS Birds of Conservation Concern 2002 that breed within the Grants Pass Resource Area.
[2] Indicates 'P' if the species is known to occur in the project area, 'S' suspected to occur based on known sites adjacent to the project area, or suitable breeding habitat exists, 'U' uncertain that the species occurs within the project area based on insufficient data, 'A' absent from the project area based on no known sites and no suitable breeding habitat within the project area, and 'T' possibly transitory species utilizing habitats within the project area during migration.
[3] Describes the facts, context and intensity to provide the rationale for the conclusion of the proposed action(s) on the species and its habitat.

**Summary of Habitat Relationships and Biological Objectives**

| Focal | Conservation Focus[3] | Key Habitat Relationships |
|---|---|---|

| | | Vegetative Composition | Vegetation Structure | Landscape/ Patch Size | Special Considerations |
|---|---|---|---|---|---|
| **Lewis's woodpecker**[2] | large snags<br><br>large conifer trees | Cottonwood<br><br>Herbaceous, shrubs, ponderosa pine | >0.8 snags/acre >16 in dbh; >0.8 trees/acre >21 dbh; canopy cover 10-40%; shrub cover 30-80%<br><br>trees >20 dbh; 2.5 snags/ha >12 dbh; tree canopy cover 10-40% | | dependent on insect food supply; competition from starlings detrimental<br><br>pine-oak sites may be most suitable |
| **Olive-sided**[2] **Flycatcher** | Early seral, mature and old growth forest edges with snags | Mt. & Western Hemlock; Noble & Silver fir | Retain >3 2.5 acre areas with 4-12 trees/acre >40 ft. tall; rest avg. 1-2 trees/acre >40 ft. tall | | Harvest units >50 acres; retain understory hemlocks & true firs, & large snags |
| **Rufous Hummingbird**[2] | Early seral habitats; Nectar producing plants | Salmonberry, currant, penstemon, paintbrush | Diverse vegetative structure | | Open space for aerial courtship display |
| **Peregrine Falcon** | Cliffs | | Diverse vegetative structure | | |
| **Flammulated Owl** | Large snags | Ponderosa pine and Jeffery pine; mixed conifer | Large diameter snags (min 12 dbh); mature forests; open canopy | | Dependent on large primary cavity excavators (Pileated's, flicker's & sapsuckers) |
| **White-headed woodpecker** | Mix of mature cone producing pine species | Ponderosa Pine mix | 50-70% canopy closure, >21" dbh snags & stumps for nesting cavities; >10 trees/acre >21" dbh | | |

[1] USFWS. 2002. Birds of Conservation Concern 2002. Division of Migratory Bird Management, Arlington, VA. 99pp. Only those that breed within the Grants Pass RA.
[2] Habitat specifications from Partner's in Flight Conservation Plans for Western Coniferous Forests, Westside Lowlands and Valleys and the Columbia Plateau.
[3] Habitat requirements of focal species highly associated with important attributes or conditions within each habitat type (PIF Westside Lowlands and Valleys and the Columbia Plateau, p. 3).

**PROJECT NAME: East Fork Illinois Landscape Management Project**
**SPECIAL STATUS SPECIES ASSESSMENT**
**Prepared by: Anthony Kerwin Date: March 23, 2006**

The following contains the USDI Bureau of Land Management OR/WA Special Status Species List (March 14, 2005). Each of these species was considered and evaluated for this project. The method(s) used to assess and review the potential effects to these species followed the techniques described in the OR/WA Special Status Species Policy (IM OR-2003-054). The following documents the basic conclusions of this assessment by species.

A description of the table's headings and letter codes are located at the bottom of the table. Additionally, general habitat descriptions for each species are included at the end of this table.

## SPECIAL STATUS SPECIES IN GRANTS PASS RA

| SPECIES | STATUS | RANGE (Y/N) | Presence | COMMENTS/ BASIC CONCLUSIONS |
|---|---|---|---|---|
| **Birds – BS & BA** | | | | |
| American peregrine falcon | BS, SE, 2 | Y | A | No nesting habitat within the project area. |
| Arctic peregrine falcon | BS, SE, | T | N/A | N/A |
| Bald eagle | FT, ST, 4 | Y | S | Bald Eagle habitat will be protected in the project area (EA pdf). All management will conform to the Biological Assessment/Opinion (log #1-15-03-F-511). |
| Black-backed woodpecker | BS, CR, 4 | Y | A | All snags >16" dbh would be reserved (EA pdf, Section 2.4.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale. |
| Ferruginous hawk | BS, CR, 4 | N | N/A | N/A |
| Flammulated owl | BS, CR, 4 | Y | A | All snags >16" dbh will be reserved (EA pdf, Section 2.4.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale. |
| Lewis' woodpecker | BS, CR, 2 | Y | A | All snags >16" dbh will be reserved (EA pdf, Section 2.4.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale. |
| Northern goshawk | BS, CR, 4 | Y | A | Temporary human disturbance, both temporally and spatially would be inconsequential. All snags >16" dbh and coarse woody debris would be retained (EA pdf, Section 2.4.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale.. |
| Northern spotted owl | FT, ST, 1 | Y | S | Temporary human disturbance would be inconsequential for all actions, both temporally and spatially. There is no designated critical habitat within the project area. Proposed actions will not preclude species from moving between LSRs and physiographic provinces. Adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the province scale. |
| Marbled murrelet | FT, ST, 2 | Y | S | N/A Project is outside the known range of the species. |
| Purple martin | BS, CR, 2 | Y | U | N/A Species is not suspected to occur in the project area. |

| SPECIES | STATUS | RANGE (Y/N) | Presence | COMMENTS/ BASIC CONCLUSIONS |
|---|---|---|---|---|
| Three-toed woodpecker | BS, CR, 4 | N | N/A | N/A |
| White-headed woodpecker | BS, CR, 2 | Y | A | N/A Species is not suspected to occur in the project area. |
| White-tailed kite | BA, 2 | Y | U | N/A Species is not suspected to occur in the project area. |
| **Amphibian – BS & BA** | | | | |
| Black salamander | BA, P, 2 | Y | U | Coarse woody debris would be retained (EA pdf, Section 2.4.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale.<br>Not located during surveys and habitat evaluations. Not suspected to occur in the project area. |
| Foothill yellow-legged Frog | BA, V, 2 | Y | S | Not documented during riparian surveys. Not expected to occur in the project area |
| Oregon Spotted frog | FC, CR, 1 | N | N/A | N/A |
| Siskiyou Mt. salamander | BS, V, 2 | Y | A | Not located during surveys and habitat evaluations. Not suspected to occur in the project area. |
| **Reptiles – BS & BA** | | | | |
| Northwestern pond turtle | BS, CR, 2 | Y | S | Not documented during riparian surveys. Not expected to occur in the project area |
| **Mammals – BS & BA** | | | | |
| Fisher | FC, CR, 2 | Y | S | Temporary human disturbance, both temporally and spatially would be inconsequential. All snags >16" dbh and coarse woody debris would be retained (EA pdf, Section 2.4.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale. |
| Fringed myotis | BA, V, 2 | Y | S | All snags >16" dbh will be reserved (EA pdf, Section 2.4.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale. |
| Pacific pallid bat | BA, V, 2 | Y | P | All snags >16" dbh will be reserved (EA pdf, Section 2.4.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale. |
| Townsend's big-eared bat | BS, CR, 2 | Y | P | Roosting or hibernaculum habitat located near the project area. If any caves are located they would be protected by 250' no treatment buffers. |
| **Invertebrates – BS & BA** | | | | |
| Chase sideband snail | BS, 1 | N | N/A | N/A |
| Evening fieldslug | BS, 1 | N | N/A | N/A |
| Mardon skipper butterfly | FC, 2 | N | N/A | N/A |
| Oregon shoulderband snail | BS, 1 | Y | U | Known sites would be buffered and coarse woody debris would be retained (EA pdf, Section 2.4.4), adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale. |
| Scale lanx snail | BS, 1 | N | N/A | N/A |
| | | | | |

| SPECIES | STATUS | RANGE (Y/N) | Presence | COMMENTS/ BASIC CONCLUSIONS |
|---|---|---|---|---|
| Siskiyou hesperian snail | BS, 1 | N | N/A | N/A |
| Siskiyou short-horned grasshopper | BS, 1 | Y | U | Not expected to occur in the project area. |
| Travelling sideband snail | BS, 1 | Y | U | Coarse woody debris would be retained (EA pdf, Section 2.4.4), adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale. |
| Vernal pool fairy shrimp | BS, 1 | N | N/A | N/A |

## Table Headings and Letter Code Definitions

**Species:** are listed by taxon. Bureau Sensitive and Bureau Assessment are combined, and then Bureau Tracking are listed.
**Status:** lists the Oregon BLM, Oregon state and then Oregon Natural Heritage Program codes in that order.

**Oregon BLM Codes:**

FE - USFW Endangered - in danger of extinction throughout a significant portion of its range
FT - USFW Threatened - likely to become endangered species within the foreseeable future
FC - USFW Candidate - proposed and being reviewed for listing as threatened or endangered
SM - Survey & Manage - Forest plan ROD directs protection of known sites and/or survey for new sites
BS - Bureau Sensitive (BLM) - eligible for addition to Federal Notice of Review, and known in advance of official publication. Generally these species are restricted in range and have natural or human caused threats to their survival.
BA - Bureau Assessment Species (BLM) - not presently eligible for official federal or state status, but of concern which may at a minimum need protection or mitigation in BLM activities.
BT - Bureau tracking (BLM) - not considered as a special status species for management purposes. Tracking will enable early warning for species which may become of concern in the future. Districts are encouraged to collect occurrence data on species for which more information is needed to determine status.

**Oregon State Codes:**

SE - State Endangered - in danger of extinction in the state of Oregon
ST - State Threatened - listed as likely to become endangered by the state of Oregon
CR - State Critical - listing is pending, or appropriate, if immediate conservation action not taken
V - State Vulnerable - listing not imminent, and can be avoided through continued or expanded use of adequate protective measures and monitoring
P - State Peripheral or naturally rare - populations at the edge of their geographic range, or historically low numbers due to limiting factors
U - State Unknown - status unclear, insufficient information to document decline or vulnerability

**ONHP Codes:**

1 - Oregon Natural Heritage Rank, threatened with extinction throughout its range
2 - Oregon Natural Heritage Rank, threatened with extinction in the state of Oregon
3 - Oregon Natural Heritage Rank, more information is needed before status can be determined, but may be threatened or endangered in Oregon or throughout range
4 - Oregon Natural Heritage Rank, of conservation concern. May be rare, but are currently secure. May be declining in numbers or habitat but still too common to be considered as threatened or endangered. May need monitoring.

**Range:** indicates yes or no, if the breeding range overlaps with the Grants Pass Resource Area. If not within the range, both presence and basic conclusion on not applicable (N/A). For invertebrates in which there is inadequate data to determine ranges, 'U' is used for unknown.

**Presence:** indicates 'P' if a species is known to occur in the project area, 'S' suspected to occur based on known sites adjacent to the project area, or suitable breeding habitat exists, 'U' uncertain that the species occurs within the project area based on insufficient data, 'A' absent from the project area based on no known sites and/or no suitable breeding habitat within the project area, and 'T' possibly transitory species utilizing habitats within the project area during migration.

**Basic Conclusion:** describes the facts, context and intensity to provide the rationale for the conclusion of the proposed action(s) on the species and its habitat.

# Appendix G. Literature Cited and References


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This publication incorporated four reports which are accessible on the internet at the following addresses:
• Courtney et al. 2004:
http://www.sei.org/owl/finalreport/finalreport.htm
• Anthony et al. 2004:
http://www.reo.gov/monitoring/trends/Compiled%20Report%20091404.pdf
• USFWS, November 2004:
http://www.fws.gov/pacific/ecoservices/endangered/recovery/5yearcomplete.html
• Lint, Technical Coordinator, 2005:
http://www.reo.gov/monitoring/10yr-report/northern-spottedowl/documents/owl_text%20and%20tables.pdf

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